FRIDAY, DECEMBER 15, 1871.

ORIGINAL LECTURES.

CLINICAL LECTURE

ON THE DIFFERENT FORMS OF PNEUMONIA

AND THEIR TERMINATION IN CHRONIC PNEUMONIA—GRAY HEPATIZATION AND ABSCESS—INFILTRATED TUBERCLE.

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GENTLEMEN,—In the last few weeks I have had in my wards several cases of pneumonia, some of which have proved fatal, and to-day I shall take advantage of them as illustrating the different forms of pneumonia, and especially their methods of termination.

You will remember that the lungs contain a number of little sacs, whose coating of epithelium is continuous with that of the tubes uniting the cavities of these sacs, and that between these sacs, forming their walls and binding them together, is a mass of blood-vessels, nerves, and fibrous tissue. With such diverse tissues to deal with, it is inconceivable that pneumonitis or inflammation of the lung should not vary, both in its clinical history and its anatomical appearances, according as it affected one or other of these tissues chiefly. Like many other affections, pneumonia occurs both in an acute and a chronic form, though, as we shall see directly, what is called chronic pneumonia is often rather the result of acute pneumonia than a distinct, true inflammatory disease. The amount of cellular tissue between the air-sacs is so small, the union of blood-vessel, nerve, and cells is so close, and the cavities of the air-vessels are so ready to receive secretion, that it is *a priori* inconceivable that an acute inflammation should occur which should confine itself to the inter-vesicular tissue, and whose exudation should be poured out into the walls—not into the cavities—of the air-sacs; and, as clinical observation bears out this anatomical inference, we are justified in our first assertion, that in all acute pneumonias the exudation takes place into the air-sacs.

A thought as to the anatomical structure of the lungs will at once show what the nature of such exudation must be. The blood-vessels abounding everywhere pour forth the exudation material of inflammation,—fibrinous serum,—which soon coagulates and forms the major part of the matters filling up the air-sacs. At the same time with this fibrinous serum no doubt white blood-corpuscles escape, and the epithelial cells lining the air-sacs, responding to the general irritation, multiply, so that under the microscope the exuded material is seen to be made up both of fibrinous filaments and cellular elements.

In most inflammations, as is well known, there are two diverse possible exudations, whose nature is largely determined by, or at least associated with, a certain condition of the general system.

Thus, pleurisy in a debauchee produces a profuse serous exudation, while in the strong man it plasters the membrane with lymph. The same thing occurs in pneumonia. In the vigorous adult the exudation, even as first poured out, is almost a jelly, while in the old or prematurely broken-down it is a thin liquid, giving origin to the so-called prune-juice sputum.

There can be no doubt that in these different forms of ordinary fibrinous pneumonia the proportion of the cell-element varies in the exudation; yet it is always a subservient, secondary part of the exuded material.

There is, however, a third form of exudation, in which the cellular element predominates, and whose character is due not so much to any recognizable condition of the system as to the anatomical construction of the lung.

Remembering the primary fact that I mentioned, that the lining membrane of the bronchial tube is continuous with that of the air-cells, and bearing in mind also the tendency which all inflammations have to travel along a tissue or membrane affected rather than to pass to the diverse tissues upon which such membrane rests,—remembering, I repeat, these facts, you will see at once that *a priori* we would expect to find a form of pneumonia whose origin should be a catarrhal or epithelial inflammation of the bronchial tubes, and whose anatomical characters should be catarrhal rather than fibrinous, or, in other words, whose exudation should be composed chiefly of imperfectly-developed epithelial cells or mucous corpuscles. It also seems to be an anatomical necessity that such disease should at first affect small isolated portions of the lungs, as the minute lobules, although by the coalescence of these the whole lobe of a lung may at last be consolidated. Every bronchial tube has subject to it as it were a certain territory of lobules, forming, it is evident, in regard to a bronchial tube of any size, a triangular mass, whose apex is the tube in question, its base the outer portion of the lungs.

Clinical observation has continually demonstrated that in children this form of acute pneumonia is exceedingly common. In the midst of an attack of capillary bronchitis the temperature of a child will suddenly rise two or even three degrees, the face will become more anxious, the breathing more rapid, the pulse quicker; and on such evidence, although the physical signs may remain unchanged, you will have good grounds for fearing that catarrhal pneumonia has set in.

Of the clinical history of such a case I do not propose further to speak to-day, as it is foreign from my object. The child dies very often sooner or later after the seizure, and on post-mortem examination there are found consolidated lobules in the lungs, whose consolidating exudation, as seen by the aid of the microscope, is composed chiefly of numerous globular or irregular nucleated epithelial elements. This, then, represents a typical case of acute catarrhal pneumonia, very common in children, but rare in adults. Why rare in adults? Partly, no doubt, because the developmental activity of the child is greater than that of the adult, and the epithelial tissues partaking of this excessive developmental power are more ready for that rapid production of cells which we call catarrhal inflammation, and partly because the formation of such pneumonic consolidation in the child is often due primarily not so much to a passage of the inflammation from the bronchial tubes to the air-vesicles as to a collapse of the latter from the child's want of power to expel the secretions of the bronchial tubes and to the anatomical changes consequent on such collapse. In the adult, collapse of the lobules of the lung from such cause is so rare, except in certain low fevers, that it may be practically said not to occur.

Acute catarrhal pneumonia causally dependent upon bronchitis is, then, especially a disease of children; but, although I have never had opportunity of verifying my diagnosis by post-mortem examination, I am confident that I have witnessed the disease several times in adults. The following is the history of one of these cases:

Case I.—P. S., aged 25, native of Ireland, and free from any known hereditary taint, came into the hospital February 2, 1871. He stated that, six weeks before, he had been taken with a severe cough after exposure, and that it had continued until the present, at times getting better, and then worse again, but never laying him up at any time. When admitted, he was in good flesh, and asserted that until within a week his appe-

tite had been vigorous and strength as usual. He had a good deal of cough, but had not spit blood. His pulse was from 105 to 115; his respirations 40 a minute. Morning temperature, 104½°; evening, 103°.

On auscultation, both right and left lungs were found to be full of fine subcrepitant and sibilant râles. He was put upon a mild expectorant. Stupes, dry cups, and poultices were applied to the chest, and were constantly had recourse to subsequently so long as the acute disease lasted.

I did not see him again until the 6th. His temperature had during that interval varied very irregularly, its lowest range being 102½°, on the morning of the 4th, and its highest 105½°, on the same day. His pulse had been from 100 to 110; his respirations 40 to 45 a minute. On the 6th his morning temperature was 104°, his pulse 128. Auscultation showed the right lung posteriorly to be everywhere full of sonorous râles and fine and coarse moist râles, and anteriorly at the apex offering a very loud, coarse, subcrepitant râle, masking a distant sonorous or tubular râle. In the left lung the vesicular murmur was distinct posteriorly, but sibilant in its character, and with some moist râles, heard especially on inspiration. Percussion produced over both lungs a similar note posteriorly; but anteriorly, while it was abnormally resonant all over the left lung, at the right apex it was hard and wooden, very wanting in volume, high-pitched, and accompanied by a markedly increased sense of resistance to the finger as compared with the other side.

Inspection revealed the chest to be full and distended, with the interspaces hardly detectible during the forced respiration. On palpation a distinct thrill was perceptible.

The sputum was exceedingly profuse, frothy, semitranslucent, thick, and gelatinous, with opaque whitish masses, and portions which were rusty-colored.

He was ordered tinct. verat. virid. On the 6th he took three doses of four drops each, and by night his temperature had fallen 2½° and his pulse some twenty beats. The night of the 6th he rested much better than he had done, perhaps owing to his taking one-fourth of a grain of morphia. During the 7th he took three doses of two drops each. His morning temperature was 101½°; his evening, 101°; his pulse at 6 P.M., 104; respirations, 32. The veratrum viride was continued, though no note was taken of the amount, and his temperature fell to 97½° on the 8th, and his pulse to 84, his respirations remaining at 32, and the physical signs not undergoing any decided change. From the 8th to the 11th the lungs cleared up very much, there being, however, some moist râles heard in both lungs posteriorly, with decided dulness, rude respiration, and very numerous coarse subcrepitant râles at the right apex. The character of the sputum had not changed very much; it was, however, less in quantity and less rusty.

The tincture of veratrum viride was suspended, and the following ordered:

℞ Ammoniæ Muriat., ʒi, ℈i;
Syr. Pruni Virgin., fʒii.
S.—Teaspoonful every two hours.

Dry cups and poultices had been previously applied to the right apex constantly; it was now ordered to be blistered repeatedly.

February 16.—Nothing abnormal could be discovered in the lungs, save the dulness on percussion, the rude, almost bronchial breathing, and the moist râles at the right apex.

The note reads on February 20, "The man coughs much less. Sputum mostly gelatinous, sometimes pseudo-nummular, not rarely containing pure blood, or blood and purulent matter mixed. He is gaining strength and flesh. The physical signs at right apex the same, but not so pronounced. The temperature has only once been above 99° since the fall on the 8th."

All medicine stopped. Ordered cod-liver oil and whiskey; the right apex to be kept sore with croton oil.

From this time the man gradually got well.

On March 19, a most careful physical examination showed that there was no distinct difference in percussion-note of the two apices, and there was a breezy vesicular murmur at right apex. There had been no cough for some days, and the man was very sleek and fat. He was kept some weeks under observation, and was finally discharged, apparently perfectly recovered.

There are some points of very great clinical importance in this case. The wasting, persistent cough, and bloody expectoration, with the marked signs of consolidation at the right apex, would not many years back have, according to all recognized rules, necessitated the diagnosis of tubercular phthisis. The final recovery shows beyond cavil that the case was not tubercular, and the whole clinical history demonstrates that the disease was not ordinary pneumonia. The case must have been one in which the bronchial tubes were chiefly and primarily affected, and the lung-tissue condensed by a secondary epithelial exudation. In a word, I imagine we have here a typical case of catarrhal pneumonia,—an attack which under more unfavorable circumstances of care and constitution would have led the way to the so-called infiltrated tubercle, as in the case which I shall detail later.

As a therapeutic study, the whole record is worthy of examination, but I would especially call attention to the rapid fall in the temperature, pulse-rate, and number of respirations per minute which occurred just at the time when the patient came well under the influence of veratrum viride, and which I am strongly inclined to attribute to that drug.

The question now naturally arises, Is there such a disease as acute catarrhal pneumonia, not dependent upon previous bronchial disease? Niemeyer says that there is not. On the other hand, Rindfleisch says that "of course we *frequently* enough have acute pneumonia of the catarrhal form *without bronchitis*."

This apparent contradiction of authorities seems to me to depend probably on the use of the name. If by catarrhal pneumonia is meant an inflammatory affection commencing in the bronchial tubes and spreading to the air-cells, of course there can be no catarrhal pneumonia without previous bronchial inflammation; but if the term simply means, as Rindfleisch apparently uses it, that in such pneumonitis the exudation is chiefly cellular, I do not see how the existence of such disease can be doubted. But I shall refer to this more in detail hereafter.

As you well know, ordinary pneumonia—that which is known by the Germans as croupous, by the French as fibrinous—is normally a cyclical disease, in which, at the end of a period varying from three to seven days, the exudation being completed, there is a sudden fall in the temperature and abatement of the general symptoms, the patient entering as it were upon convalescence, or at least a period of repair, with the road to health open to him only by the freeing of the vesicles from their contained exudation. As the little plugs that fill the air-sacs are mostly much larger than the openings into the bronchial tubes, it is necessary that the exudation matter should be softened if it is to be expelled or absorbed. Rindfleisch believes that but a comparatively trifling portion of the exudation is absorbed, and that nearly all of it is cast out by expectoration. But, from clinical observation, I think that absorption bears a very much more important part in the removal of the exudation than this. However this may be, there can be no doubt that both absorption and expectoration aid in the removal, and that to facilitate these the fibrinous plug undergoes two distinct changes,—one a fatty degeneration, the second the conversion of the fibrinous filaments into a soft gelatinous mass, chemically allied to mucin; and that while this is occurring there is a free formation of cells upon, and, to some extent, even within, the alveolar walls. If matters progress favorably after the exudation is softened, it is gradually removed by expectoration and absorption, so that at last the lung is free and the patient well. Unfortunately, however, not

always does the disease end so favorably; for, instead of resolution following exudation, the latter may remain unchanged, and the result be, first, chronic pneumonia; or, secondly, suppurative changes in the lungs may occur, and the so-called gray hepatization be the result; or, thirdly, caseous degeneration may ensue, and the so-called infiltrated tubercle result; or, fourthly, gangrene of the lung may take place.

Let us now take up these various unfavorable terminations as illustrated by the post-mortem specimens before you, and consider, especially anatomically, how they are brought about.

The anatomical cause of the chronic pneumonia remaining appears to be simply the failure of the ordinary changes to occur. The fibrin does not undergo change into mucin, and the cells seem simply to shrivel away, but not to be in sufficient quantity to cause disintegration of the entire mass. Why these changes fail to occur I do not know. Possibly there is something in the original constitution of the exudation which interferes; possibly the ancients were not altogether wrong in their belief in the absorbents playing an active part in the physiological and pathological economy.

Whatever be the cause, in this hospital this termination of pneumonia is exceedingly common; although many writers do not attach so much importance to it as I think it deserves.

Niemeyer makes no distinct allusion to it in the article in his Practice upon pneumonia. Jaccoud, however ("Traité de Pathologie interne," tome ii. p. 49), describes it very distinctly. He states that there are two forms of it: one in which the arrest of the acute process seems to occur at the end of the stage of exudation; the other in which it takes place during the period of liquefaction and absorption. He says that in the first case the lung-tissue is compact, homogeneous, impermeable, vaguely granular. The appearance is very much that of the acute disease, the only difference being in the color and contained liquids; the hyperæmia has disappeared, and the color become slaty-gray, with black spots, due to the deposition of pigment granules; the absorption of the liquid is total, so that the tissue is dry and condensed. In the other case, the aspect of the lesion is different: it does not form a compact mass all in one block; the permeability of the lung is established in places, and the alveolar cavities contain some fibrin, dried and fatty purulent globules, and atrophied alveolar cells: the breaking down of the exudation has taken place, but the elimination has been arrested.

Of the second of these forms I know nothing from experience; the first I have seen repeatedly. How long this form of chronic pneumonia will endure I do not know, but I have seen many cases in which the history pointed to its having existed for a long time. It is probable that in many instances it finally causes chronic interstitial pneumonia, and, at last, contraction and a cirrhotic condition of the lung, or else ends in caseous degeneration. That it often does not do so for a very long time,—that patients far advanced in life die, and portions of the lungs are found affected with chronic pneumonia, whose origin is obscured in the far past and whose existence was not suspected during life,—I most certainly know.

The following is the report of the fatal case, the lungs from which are upon the table:

Case II.—Mary W., aged 38, mother of three children, house-servant, was admitted into the hospital November 3, 1871. She was so exhausted that no very clear history could be elicited, but she stated that three weeks before her entrance she had been taken with severe pain in the right side, and breathlessness, and had been ill ever since.

She was exceedingly weak, and her intellect was greatly oppressed. She had cough without expectoration, pulse from 110 to 120, and abdomen very tympanitic.

On physical examination there was abnormal percussion resonance, with puerile vesicular murmur, over the whole of the left lung. On the right chest, both anteriorly and posteriorly, absolute flat and hard percussion dulness from base to apex. Over the upper lobe of the lung, both anteriorly and posteriorly, there were coarse, moist bronchial râles and tubular breathing. On a level with the angle of the scapula these had faded away to a faint, distant tubular breathing; below this was absolute silence. Old friction-râles could be heard laterally on forced inspiration. Vocal fremitus and resonance were much greater on the right than on the left side.

The woman died two or three days after admission.

Autopsy.—Left lung normal. Right lung absolutely solid from top to bottom; agglutinated to the side by not very old adhesions, and, when taken out, bearing very plainly the marks of the ribs on it. When cut into, very firm and solid, light-grayish or almost whitish, with numerous dark spots or pigment depots. Nowhere any signs of softening or cavities.

The second termination of pneumonia in our schedule is in diffuse suppuration, if such term is allowable,—that known as gray hepatization. This occurred in the case which I had before you at my last clinic, the specimen from which is on the table.

It is always to be feared in any case when the sudden fall of temperature—the crisis—fails to develop, or, developing itself, fails to persist, and, at the same time, very low typhoid symptoms are manifested; and especially is the danger imminent when along with these symptoms coarse moist râles are to be heard in the affected lung. Some authorities ascribe importance to distinct chills or repeated slight shiverings as diagnostic of the formation of pus in the lungs.

These were not present at all in the case herein described, and my experience leads me to coincide with the opinion expressed by Walshe, that it must be a very clear conjunction of symptoms and physical signs which warrants an absolute diagnosis of diffuse suppuration in a lung.

Now, what are the anatomical differences between the processes of resolution and gray hepatization? It must be borne in mind that in cases of resolution during the time when the exuded material is being removed there is a free formation of cells in the epithelium lining the air-sacs, and that there is also a tendency to over-rapid cell-increase within the alveolar walls. Now, in the degeneration of which we are speaking, this tendency being exaggerated, cell-multiplication takes place in both of these positions with great rapidity. Within and without the walls of the vesicles cells multiply. More than this, I am convinced, though not in a position absolutely to affirm it as proven, that in all these cases from the very onset the inflammatory products are largely cellular; that the exuded material is very poor in fibrin and rich in cells; that, in other words, the affection approaches closely the catarrhal type. The sputum in such cases certainly indicates it; and it is inconceivable that a mass composed chiefly of fibrin filament should be changed into a purulent, cellular liquid.

However this may be, excessive cell-multiplication—a multiplication so rapid that reproduction takes place at the expense of vitality—occurs on and within the walls of the alveoli of a lung about to undergo the purulent degradation. Under its influence the parenchyma of the lungs swells up and becomes more dense and heavy. At the same time the granular appearance which the filled alveoli produce in the red hepatized lung becomes less marked, from the swelling of the alveolar walls, and the color changes from reddish to whitish or yellowish. This alteration of the color is evidently due in some measure directly to the rapidly-increasing cells within and without the alveoli, but

chiefly to the pressure which they exert upon the blood-vessels, preventing the passage of blood into the affected tissues, which therefore become exceedingly anæmic.

The degeneration of these cells into pus or pus-like globules is of double origin. In the first place, their own native want of vitality facilitates their death; but I believe an even more important factor is the pressure which they themselves exert, cutting off their supply of blood,—*i.e.* of nutriment,—and causing death by starvation. I want to lay stress upon this point, because this purulent degeneration of the lung is the same in kind as the caseous degeneration,—the so-called infiltrated tubercle,—caused by the same anatomical changes, only that in the one case the course is rapid, in the other slow; in the one the cells multiply quickly, drive out the blood, and produce rapid local death, with exudation of more or less serum, in the other the cell-multiplication is slower, the blood-current is more gradually lessened, the death takes place more slowly, and is accompanied with desiccation. The two cases bear almost the same relation to each other that the moist gangrene which follows sudden arrest of circulation does to the dry gangrene caused by atheromatous arteries.

Wherever a large amount of lung-tissue is involved in the gray hepatization, death of the patient follows rapidly; but in cases in which but a small amount of tissue is involved, and, therefore, life endures, or in cases like the one I showed you, in which the process is much more early or intense in one portion of a lung than in the remainder, the degradation goes on to its full conclusion, the whole tissue especially involved perishes, and an abscess results. Such cases are, however, very rare, Trousseau stating that he had had twenty-five years of hospital experience before seeing one. The following is the record of the case the specimens from which are on the table:

Case III.—J. H., aged 32. A very intemperate man. Entered the hospital November 2, 1871. He stated that for the previous week, or longer, he had been drinking very hard, lying out at nights, and that he had been taken sick several days before with sick stomach, headache, slight pain in the side, and cough.

I saw him first November 3. He had passed a restless, delirious night; had a feeble pulse of 100, and a very anxious expression of face. At the apex of right lung anteriorly could be heard a coarse crepitant râle to the fourth rib, and with it was some dulness on percussion. He had a free expectoration of dark, brownish, leaden, slightly gelatinous sputum. He was ordered opium, gr. i, every three hours, with chloral at night, and poultices over the apex of the lung.

November 6.—His condition had not improved. The pulse was 110. Tongue dry, red and smooth on edges, yellowish fur in the centre. There had been the day previous slight diarrhœa without tympany. At night he was very delirious and restless. The sputa were variable, at times almost truly pneumonic, but were mostly brownish and thin. At right apex to fourth rib was high-pitched percussion-note, with but little volume and wooden tone, and tubular breathing with crepitant râles. Ordered whiskey f℥vi in twenty-four hours.

The following is extracted from my note-book:

"November 9.—Last night the only one at all free from delirium. His condition seems, however, very bad this morning. His surface is bathed with sweat. Pulse 120. Face very anxious. Tongue red, dry, cracked. Ordered tincture of digitalis three times a day.

"November 11.—Since last note, he has been almost wildly delirious every night; is in low, muttering delirium this morning. Has to be kept tied in bed day and night. The percussion dulness and bronchial breathing are extending downwards,—now reach below the nipple. The general symptoms are all worse, but the pulse is full,—a marked digitalis pulse,—78 per minute. The sputum is very free, almost bronchoreic, gelatinous, frothy, not at all rusty. Stopped digitalis. Musk was directed, but, it not being obtainable, castor was ordered,—30 grains every two hours in emulsion. Quinine was also directed.

"November 12.—Yesterday afternoon, after taking four doses of castor, he became rational, and during the night was scarcely at all flighty; does not have to be strapped down in bed. He is now rational,—talks about himself. There are decidedly more coarse moist râles at right apex.

"November 13.—Has been much quieter and more rational, but is somewhat flighty this morning."

From this time to November 15 the man gradually sank. On the 14th, the moist râles were most profuse, marking the bronchial breathing. On the 16th, cavernous respiration was detected in the right apex. On the 17th, he died, with profoundly typhoid symptoms.

Autopsy.—Left lung healthy; right lung whole. Upper lobe in a state of marked gray hepatization. On its apical surface were a number of little vesicles (distended air-sacs) filled with pus, and most of its apical fourth was occupied by a recent cavity, with irregular shreddy walls, formed of lung-parenchyma, gradually melting into the abscess.

As has, I hope, been made sufficiently clear, there are two forms of pneumonia,—the one to which the name catarrhal may be applied, the other which we may know as fibrinous. In the first, the exudation product is largely made of cells,—imperfectly-developed epithelial elements; in the other, the exuded matter is principally fibrinous. Now, I believe that although there are these two distinct types of pneumonia, yet that there is also in nature every gradation between them; that in some middle cases the cellular and fibrinous elements or material may be as it were about fairly balanced, and that in others the fibrinous material most abounds, while in still other cases of primary pneumonia from the very outstart the cellular element is as abundant as in the exudation of the lobular pneumonia secondary upon bronchial inflammation. It is in these cases of cellular exudation especially that the last termination of acute pneumonia of which I shall to-day speak is especially apt to occur,—that which was formerly known as acute infiltrated tubercle.

There is in such cases of pneumonia, from the very outset, an intense and rapid multiplication upon the alveolar walls of the epithelial cells, which, accumulating more and more, at last entirely fill up the alveoli affected. It is self-evident that such an exudation is not nearly so easily gotten rid of as a fibrinous one. The latter may soften and break down into a mucoid mass, but cells do not do this readily. More than this, the tendency to reproduction of cells does not confine itself to the epithelial tissue, but affects also the inter-alveolar tissue, until at last a solid mass is formed, the cells within crowding those without the alveoli. As a result, pressure upon the blood-vessels is exerted, until their calibre is obliterated or the current in them stagnated and the supply of blood to the part is cut off. What then happens? Death of the part affected. The deprivation of blood is, however, gradual, not sudden, and the death is slow. The cells in the interior of the alveoli are the first to suffer, because they are the farthest removed from the nutritive supplies; having from their very birthhood a tendency to fatty degeneration, they slowly undergo it, and at the same time shrivel up under the pressure, which squeezes out of the tissue the fluids contained in it. Even with the naked eye the change can be marked commencing as a whitish spot in the middle of a dark mass of consolidated tissue, and spreading from within outwards.

There is nothing strange in this,—nothing peculiar to the lungs.

Some years ago, Dr. Wilks, of London, declared that leucocythæmia was a disease allied to tuberculosis, because he found whitish masses in the spleen, whose elements, under the microscope, resembled greatly the "tubercle-cell," so called,—little, shrivelled, fatty cells.

His reasoning was not so absurd as it at first seems. If there had been any such thing as "tubercle" in the sense that he understood it, he was right in considering the splenic masses as deposits, for they were truly in their origin, as well as in their appearance, similar to "infiltrated tubercle;" the real absurdity consisted in considering infiltrated tubercle a deposit. I said the origin of these white masses is similar to that of infiltrated tubercle, and I think you will agree with me when I describe it.

In leucocythæmia there is a hyperplasia of the cells of the spleen, similar to what takes place in the lungs in catarrhal pneumonia, until at last some acini of the spleen become so crowded that no blood can flow through them. Several acini together undergo this process, so that at last a dark mass is formed, in which the blood-current has stagnated. Thus the cells, imperfect from their rapid birth,—cut off from their supply of blood,—undergo shrivelling and fatty degeneration. As in the case of the lungs, in the centre of the mass where the blood-current has first stagnated and the cells are most crowded, the white spot which marks the change first appears, and spreads from within outwards, until at last a mass of "deposit" is formed. The processes are precisely parallel in the lung and in the spleen.

Let us return to our lung from this digression. The degeneration of the cells of the affected part, continuing, spreads from the centre of an alveolar cavity to the alveolar walls, which are soon involved in the common death. Then from the portions of lung not yet affected serum begins to be thrown out, and to permeate the mass, until at last the whole diseased tissue breaks down, melting away alveolar walls and all, and a cavity results.

Such, gentlemen, is the idea of the course of infiltrated tubercle, omitting the non-essential details.

You see that there is no deposit,—that there is an exact parallelism between the caseous degeneration and the gray hepatization,—the differences being in the rapidity rather than in the nature of the changes.

The lung on the table before me is a marked example of this caseous degeneration.

The record of the case will be given you directly. The history, unfortunately, is not so complete as is desirable. There was an allusion made by the patient to an attack of lung-trouble some years before, but, whatever that may have been, he appeared to have recovered from it. The disease was certainly very acute; and if, as he affirmed, the whole course was run through in a couple of months, it was certainly a marked case of galloping consumption.

Case IV.—J. W., æt. 28, single. Came into the wards of the hospital October 22, 1871. He was in such a typhoid condition that his history was obtainable with some difficulty. He stated, however, that none of his relatives had ever died of consumption; that he had been taken sick only five weeks previously, after exposure; that he had lost flesh very much in that time. This history was confirmed in so far that a former employer stated that he had left him five months previously to go to boating, and that when he left he was in perfect health. The notes in his case read as follows:

"October 23.—The patient is very weak and emaciated, with a dry scurfy skin. He has a hacking cough, but spits up very little, evidently swallowing his sputum; that which is expectorated is muco-purulent.

"*Right chest.*—Abnormal percussion resonance all over the lung, with puerile vesicular murmur, and at anterior apex the expiratory sound almost tubular.

"*Left chest.*—Percussion-note anteriorly and very wanting in volume to an inch above line of ensiform cartilage, where it becomes colonic; laterally much the same, save that high up it is very high in pitch. On auscultation, all over anterior upper lobe cavernous breathing, without moist râles, and most intense in middle front of third rib. In supra-spinous region rather distant gurgling and blowing râles, with painfully-resonant cough. Laterally and inferiorly, both in front and behind, friction-râles, moist crackling, and tubular breathing.

"October 29.—No change, except patient is weaker. He expectorates about one-third of a pint in twenty-four hours.

"November 2.—All over left anterior chest to seventh rib, where note becomes colonic, there is short, low-pitched, very volumeless percussion-note, save at the extreme apex, especially to the left side, where the percussion-note has much more volume. All over this region are cavernous râles and very loud, thin, coarse gurgling, with squeaking râles at the apex, and thin moist râles especially abundant below. Very pronounced pectoriloquy, with a very decided whispering echo to the voice-sound. Moist râles are heard in right lung inferiorly.

"November 6.—Right lung, the lobes full of moist râles, and dull on percussion.

"November 12.—Man died of exhaustion."

Autopsy.—Whole upper lobe of left lung resolved into an enormous cavity, evidently formed by the coalescence of smaller cavities. Lower lobe solid, with chronic pneumonia, undergoing caseous degeneration, and containing some small cavities,—apparently enlarged bronchial tubes. Pleura forming a thick coating to the whole upper lobe of the lung.

Right lung, upper lobe markedly emphysematous; lower lobe consolidated with wedge-shaped masses, in which the color was changing to that of caseous degeneration.

ORIGINAL COMMUNICATIONS.

A CASE OF TRAUMATIC TETANUS

TREATED WITH CALABAR BEAN AND CHLORAL, RESULTING IN DEATH.

BY WILLIAM H. BENNETT, M.D.

IN the number of the *Medical Times* for January 16, 1871, Dr. Packard gives an account of what he terms a "Case of Severe Traumatic Tetanus resulting favorably under the Use of Calabar Bean." The following case, occurring also in the service of Dr. Packard (by whose kindness I am permitted to publish it), gives a darker picture. The two cases taken together illustrate what has now been pretty well demonstrated in regard to the remedial power of calabar bean in this disease,—that, while it will not cure tetanus, it will generally, in some degree, relax the contracted muscles and diminish the frequency and violence of the paroxysms, and hence is a valuable palliative in all cases. It is especially so in those coming on late after the receipt of the injury and tending to run a chronic course resulting in recovery, but in which much depends upon our ability to sustain the vital powers until Nature accomplishes a cure.

C. J. G., æt. 18, white, was admitted to the Episcopal Hospital on the evening of July 4, 1871. During the afternoon, while holding his left hand over the muzzle of a pistol loaded with small shot, the firearm was accidentally discharged, and its contents entered his hand, making a wound with an external opening in the centre of the palmar surface about one and a half inches in diameter, and extending through to the subcutaneous tissue of the dorsal surface. The metacarpal bone of the middle finger was broken across and somewhat splintered. The deep tissues were much lacerated and charred, and when he was admitted a mass of them protruded from the external opening, almost entirely closing it. The wound had been previously examined and cleaned, and no foreign bodies could then be discovered.

He was of robust frame, in good health, and had not lost a very large amount of blood. He was placed in bed, and an evaporating dressing of lead-water and laudanum applied to the hand. He was carefully warned of the dangerous conse-

quences which might result from taking cold, and every precaution was employed to avoid exposure to draughts of air or sudden changes of temperature. The lead-water and laudanum dressing was renewed day by day until the 8th of July, when a poultice was applied for forty-eight hours, and then a covered dressing of lead-water and laudanum substituted for it. He was placed on low diet for the first few days, until suppuration was established, and then a generous diet was ordered.

The wound did well from the first. The slough had mostly separated by the 11th, and the pus was discharging freely, both from the opening in the palm—now entirely clear—and from one on the dorsum, caused by the sloughing of a small portion of injured skin and subcutaneous tissue.

At 12 A.M. on the 11th, seven days after the accident, while eating his dinner, he complained of a little unusual feeling about his throat, which he had had most of the morning, but to which his attention was more particularly called by a slight difficulty in swallowing his food. He also stated, in answer to a question, that he had a little pain in the nape of his neck, and there appeared to be very slight trismus. These symptoms, however, were all so slight that it was thought best to delay any active treatment until the diagnosis should be more clearly made out; and nothing therefore was done beyond ordering a liniment of chloroform and tincture of aconite-root for the neck, and carefully watching for further developments. It was now discovered that on the night of the 9th he had left his bed and gone to the water-closet, which has a stone floor, without putting on either slippers or clothing; also, that for some days he had been in the habit while eating his meals of sitting on the side of his bed, only imperfectly covered with the bedclothing, with his feet on the floor. No other history of exposure to cold could be discovered.

At 7 P.M. of the 11th, no change in his symptoms since morning was perceptible.

At 8 A.M. of the 12th, the trismus was more marked, but there was little increase either in the pain in the neck or the difficulty in swallowing. A slightly contemptuous expression seemed to be due to commencing risus sardonicus. His pulse was 92, of good volume and strength, and his respirations 24. His pupils were natural; his mind clear and cheerful. His wound was healthy, and, with the exception of the ominous symptoms referred to, he seemed to be improving as rapidly as possible. Two grains of the extract of calabar bean, known to be of good quality, were then given to him, and the dose was repeated at 10 A.M.

By 12 M. he had begun to feel an occasional pain shoot up the arm from his injured hand. Ether was now administered, and an incision about four inches in length made on the dorsum of the hand. A portion of the wad of the pistol, and two small shot, which had been deeply lodged in the wound undiscovered, were removed, and the jagged ends of the fractured metacarpal bone cut off.

At 2 P.M. he had reacted from the effects of the ether; two grains of the extract of calabar bean were given him, and half a grain of sulphate of morphia was injected beneath the skin of the left arm. Two grains of the extract were also administered at four and two grains at six o'clock. The combined effect of ether, calabar bean, and morphia produced some nausea.

At 7 P.M. his pupils were well contracted. His pulse was 120. Little change in the amount of trismus had occurred since morning. He now had some twitching of the left arm and pain still occasionally darting through it. His skin was bathed in perspiration. The two-grain doses of the extract were repeated at 8 and 10 P.M.

At 2 A.M. of the 13th his symptoms were all worse. Two grains more of the extract were given him, and the dose was repeated at three, four, seven, and eight o'clock A.M.

At 8.30 A.M. his pulse was about 80, but very irregular. The twitching and darting pain of the arm had kept him awake all night. The trismus, risus sardonicus, and difficulty in swallowing had increased. He was much weaker. There was now some opisthotonos, and both this and the trismus were occasionally violently and spasmodically increased. He had had two large, well-formed stools during the previous twenty-four hours, and his urine was passed without difficulty.

During the day the extract of calabar bean was given to him nearly every hour, in such doses as were thought at the time judicious, his pupils being kept constantly contracted to a very small point. In all, twenty-four grains were administered in eleven hours. Half a grain of sulphate of morphia was given hypodermically at noon, and he had a little sleep after it. The following note was made of his condition at 7 P.M.: All of his symptoms have to-day been gradually growing worse. His jaws have been slowly approximating. The spasmodic contractions of his muscles are more frequent and of longer duration. They are at times, but not frequently, excited by noise, touch, or other sudden impression. He has great difficulty in swallowing, but by patient effort he has been able to take his medicine regularly, and some liquid food and stimulus. After each mouthful, however, a portion is blown out between his nearly-closed teeth, with a noise almost peculiar to this disease. His voice is still nearly natural. He has all day been bathed in a profuse perspiration. He has had some nausea, and once vomited a little. His mind has been perfectly clear, and his calmness in such suffering is extraordinary. His pulse is 120, and his respiration 26.

Although the calabar bean seemed in some measure to control the frequency and violence of the paroxysms,* yet he appeared to be growing so steadily worse in all of his symptoms, and so rapidly weaker, it was thought advisable to try some other remedy, and chloral hydrate was substituted for it. This was ordered to be given in doses of twenty grains every two hours. Chloroform was also applied along the spine. He soon had a little sleep, from which he was awakened by one of the paroxysms; and, although he continued thus to sleep for short periods during the night, his symptoms rapidly grew worse.

At 4.30 A.M. of the 14th, during a paroxysm brought on by an attempt to give him his medicine, his tongue was caught between his teeth, badly lacerated, and tightly held there for some time. The paroxysms were now returning about every ten minutes, and were so severe as at times to nearly throw him out of his bed. It was therefore determined to put him under the influence of chloroform. This was administered by inhalation in quantities just sufficient to keep him unconscious during the paroxysms. These still continued to increase in frequency, duration, and severity during the morning, his strength gradually became exhausted, and at 3.30 P.M. he died.

No post-mortem examination was permitted.

SOME NOTES ON THE USE OF HYDRATE OF CHLORAL.

BY JOSEPH R. BECK, M.D.,
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ABOUT two years ago this drug was brought in a very conspicuous manner to the notice of the profession, although it had been used by a few physicians for a much longer period. I refrained from using it for a time, preferring to allow others the pleasure of experimenting, but intending to make use of it when I should become convinced of its utility from the published testimony of other members of the profession. To this end all the literature on the subject was eagerly sought for, carefully read, and thoroughly digested; and although there is a great mass of such evidence extant, yet, according to my view, it is so contradictory and vague in point of conclusions that it even now seems as if it were just as well not to read any of it. I began—very cautiously, it is true—to administer the remedy in appropriate cases, and in what seemed to be small doses, and I have not yet, after a

* In a case of traumatic tetanus occurring in the hospital a short time before, in which the extract of calabar bean was employed, the patient stated that he felt "every dose do him good;" and when it was almost impossible for him to swallow, he begged that the medicine might still be given him, as he felt such relief from it. The case, however, proved rapidly fatal.

fair trial of nearly two years, had reason to think that I erred in pursuing this course.

It is not proposed within the limits of so brief an article to go into detail as to the analytical chemistry of the hydrate of chloral, nor even to discuss its therapeutical action, but simply to add my experience in the use of the drug to the current literature on the subject. It is a small mite to contribute, to be sure, but I am satisfied that the majority of the profession use this valuable medicine in so injudicious and indiscriminate a manner that frequently great harm is the result. Under these circumstances, as has always been the case, the drug comes in for the lion's share of the opprobrium, whereas, if the truth were told, the practitioner really deserves it.

Continuing our review of the subject, I shall first speak of a few cases under my observation in which beneficial results were observed from the administration of the drug, and then proceed to remark in the briefest possible manner upon what seems to me to be proper to be said as to the dose. Although chloral has never produced bad effects in a single instance, and has never failed to come up to my most sanguine expectations in its results, yet I am impelled to say that I do not possess that overweening confidence in its universal efficacy which some of my brother practitioners seem to have. While hydrate of chloral is undoubtedly a very valuable contribution to our materia medica, and fills a gap in therapeutics which seems to have been destined for it, yet I do not see the propriety of vaunting its praises in *numberless* diseases, and over and above *any* and *every other* remedy; and when I notice such literature in our journals, the words of Dr. Samuel Wilks recur forcibly to my mind, wherein he says (London *Lancet*, February 25), "The universal use of chloral in every possible malady presents a most pitiable exhibition of the weakness of our therapeutics. Every one who is ill has a pain or an ache, or is irritable and restless, and at length we have got a panacea. What can be thought of our art, when we are so ready to catch at a new drug and administer it to everybody? Now it is chloral; yesterday it was carbolic acid; and before that it was bromide of potassium. Just as, two years ago, every one was taking this last medicine, so now every one is swallowing chloral. It is a most sorry patchwork piece of business."

While I widely dissent from the intimation of Dr. Wilks that chloral is a "humbug," yet I am convinced that its universal administration for almost every known disease savors very much to me of a very patent humbug; and the conviction is also forced upon me that, whereas ordinary humbugs have the merit of being at least harmless, the immense doses of hydrate of chloral which some writers recommend would make of this drug, at least in some cases, a very dangerous humbug.

I cull from my case-book for the last six months of 1870 and the first six months of 1871 the following cases, which will better than any argument convey to the reader my ideas as to the administration of chloral:

Case I.—E. M., aged sixteen years. Is passing gall-stones. Ether ineffectual; large doses of opium equally so. Gave chloral, followed by almost instantaneous relief in sleep,—the first he has had for four days and three nights. Dose, fifteen grains in syrup and water every two hours, as long as the paroxysm persists. Effect almost magical.

Case II.—J. C., a middle-aged man, of very violent temper. Had a fit of anger last night. Hepatic colic to-day. No relief followed powerful purgatives, anodynes, and sinapisms. Gave fifteen grains of chloral every two hours until relieved. Pain ceased in three hours.

Case III.—Mrs. H., aged sixty-nine years. Underwent operation for the cure of a lacerated perineum at the hands of the late Dr. George C. Blackman, of Cincinnati, Ohio. Operation was unsuccessful. While under treatment she acquired the habit of taking opiates to induce sleep. Cannot sleep at all now without their influence. Gave fifteen grains of chloral at bedtime, to be repeated at midnight, if necessary. Sleeps much better than with opiates, and is not constipated. Has almost entirely ceased to take opium. Continues the chloral in preference.

Case IV.—Miss A. R., aged twenty-four years, unmarried. Case of confirmed dysmenorrhœa. Gave fifteen grains of chloral, with the effect of relieving the pain almost instantaneously. Repeated the dose only once during this paroxysm.

Case V.—Mrs. R., aged forty-nine years. Mother of preceding. Is subject to spasmodic asthma, and constitutionally intolerant of opium in any shape. Has been treated with almost every drug ever used in this disease, and has never been more than temporarily relieved. One dose of fifteen grains of chloral cuts short an attack, and if taken in time the spasm is entirely warded off.

Case VI.—Mrs. B., primipara. Was delivered of a still child at full term with forceps, and was in danger of puerperal convulsions. Took fifteen grains of chloral at bedtime every night for three weeks. One dose sufficed for a sound night's rest, and she improved rapidly. Experienced no bad effects, although she took medicine twenty-one nights successively.

Case VII.—Mrs. T., aged forty-eight years. Case of dysmenorrhœa which is habitual, and mania a potu which is occasional. Fifteen grains of chloral every two hours until she sleeps. Four doses sufficed to quiet her.

Case VIII.—Mrs. J. G. H., aged thirty-four years. Case of amylaceous dyspepsia. During digestion of starchy articles of diet she suffers intense pain in the epigastric region. To take fifteen grains of chloral after each meal. Never had a recurrence of pain after second dose, and experienced no inconvenience from drug, although she used it nearly six weeks.

Case IX.—Mrs. A. T. R., aged thirty-seven years. Case of dysmenorrhœa of many years' standing. Has been accustomed to inhale ether for relief at these times. Ordered fifteen grains of chloral to be given every two hours until paroxysm has passed. Takes successive doses for about three days, that being the ordinary duration of her catamenial period. Finds relief more promptly from the chloral than from ether, and no bad or unpleasant results.

Case X.—Mrs. T. J., aged thirty-five years. Has been hysterical for many years. Is very troublesome at such times to her husband and family. One dose of fifteen grains of chloral puts her to sleep.

Case XI.—R. H., aged thirty-three years. Boiler-maker by occupation,—physically powerful and athletic. Periodical drunkard. Case now one of delirium tremens. Gave fifteen grains of chloral, and repeated the dose every two hours until sleep was produced. Sleep relieved him shortly after the sixth dose. Took in all ninety grains of the drug.

Case XII.—J. N., aged twenty-eight years. Case of commencing mania a potu. Fifteen grains of chloral at 3 P.M. Dose repeated at 5 P.M.; slept at 6, and awoke all right next morning.

It will not be necessary to multiply this record, and it is closed by referring the reader to the case of "Modified Variola" treated by me in 1870, and published in the *American Journal of the Medical Sciences* for October, 1871, p. 413. In this case I gave a larger quantity of chloral, and continued its administration during a longer period of time, than in any other case in which I have ever employed it. The dose was but fifteen grains, but it was given night and day for a period of fifty-seven hours,—three hours intervening between the doses,—thus making an *amount of two hundred and eighty-five grains* consumed by this patient.

I am of the opinion that in chloral we have a very valuable therapeutic agent in many other diseases than those above enumerated, but I have reported only those cases in which I happen to have used the drug in the greatest quantity.

Having finished what was to be said as to the value of chloral, I devote a few words, before concluding, to

some directions as to the doses in which it should be given.

I decidedly incline to the opinion that the dose which I have ordinarily used—namely, fifteen grains—is sufficient to commence with in any case. Of course each case must stand upon its own individual merits; and this idea holds good with regard to every other drug in the Dispensatory. But in ordinary cases, just as experience has shown, for instance, that a dose of one grain of solid opium is sufficient to give its proper effect, I should say fifteen grains of hydrate of chloral is amply sufficient for one dose.

Now, how soon may we repeat this dose with entire safety to the patient, and how often? This, again, will depend upon sleep being induced or not by the first dose; or, if induced, whether it has lasted as long as we desired. On the whole, experience has taught me that the dose of fifteen grains may be safely repeated every two hours for a limited time,—say twelve or twenty-four hours, if its effect be not induced sooner.

Finally, my experience in the use of the medicine under consideration has been so uniformly successful, not having a single disappointment to record, that I feel constrained to say that under no circumstances now known to me would I give a larger dose than that above stated to be my ordinary one.

NOTES OF HOSPITAL PRACTICE.

UNIVERSITY OF PENNSYLVANIA.

CLINIC OF PROF. AGNEW, SEPTEMBER 20, 1871.

Reported by Dr. Elliott Richardson.

ONYCHIA.

AT Prof. Agnew's clinic, held September 20, 1871, two cases of this affection were presented, differing somewhat, but presenting the same indications for treatment.

The first case was that of a youth aged 19 years. He had an ingrowing nail of the great toe, which had produced ulceration of the soft parts in the vicinity of its inner border. The condition was due, in this instance, to the pressure of tight-fitting boots. The professor said the formation of these ulcers was facilitated by the habit of cutting the nails down at the corners, and that those suffering from syphilis or other constitutional disease were also much more liable to affections of this character. In regard to the treatment, the lecturer said the most satisfactory method was to remove the nail completely, and to prevent its subsequent formation by thorough cauterization of the matrix with caustic potassa. Other less radical measures had been recommended: of these, one, which had been sometimes successful, was to cut away the portion of nail impinging upon the ulcer, to pare off the granulations, and then to apply ungt. hydrarg. ox. rub., or other alterative ointment. This method, he said, was much less efficient and satisfactory than the total extirpation of the nail and matrix.

The patient was then etherized and the operation performed. The nail was loosened as much as possible, with the end of the thin handle of a scalpel inserted between it and the matrix. It was then divided in the median line, and the two portions removed with moderate traction. The fold of skin over the base of the nail was divided for a distance of about one-third of an inch, to admit of easy access to the matrix. This tissue was then destroyed by a free application of caustic potassa. A pellet of lint, dipped in oil, was pressed into the wound. This it was directed should be retained for twenty-four hours without any additional dressing. At the expiration of that time a flaxseed poultice would be applied, and continued until the slough should separate, when the granulating ulcer remaining would be dressed with cerat. resinæ.

The other case was that of a woman, aged 40 years, who had a distorted nail, which had grown, according to her account, after removal of the nail and unsuccessful efforts to destroy its matrix, made a few years ago. Small abscesses had formed at times under this deformed appendage, giving rise to much pain and inconvenience.

The patient was etherized, the nail removed, and the matrix destroyed as in the preceding case.

MORBUS COXARIUS.

On the same day was presented a boy, two years of age, suffering from strumous disease of the hip-joint. The history obtained of the case was that he began to walk at the age of one year, and gave no evidence of ill health until six months afterwards, when it was noticed that he walked lame. This difficulty had since continued to increase, and at the present time he exhibited unmistakable evidences of the disease in its suppurative stage. The buttock was flattened, and the foot advanced and everted. About the great trochanter and for some distance below, the parts were tumid, heightened in color, sensitive to the touch, and gave a sensation of fluctuation.

An abscess had undoubtedly formed in this locality, which, the lecturer said, most probably extended into the joint. Prof. Agnew, in the course of some remarks upon the origin and development of this disease, said that it commences, in a large majority of cases, in the cancellated structure of the head of the femur, whence it extends to the cartilage and the synovial membrane. The joint then becomes the seat of abscess, and the accumulation of fluid inside the capsular ligament distends it, and causes flexion of the thigh upon the abdomen, and eversion of the limb. The capsule is at length penetrated, and the abscess seeks a vent at some point on the surface of the hip or thigh.

The treatment for this disease is of both a constitutional and a local nature. For the former, cod-liver oil, iodide of iron, and other tonics are established remedies; for the latter, rest, and, in the early stages, counter-irritation, either by small blisters, frequently repeated, or the actual cautery.

In this case, as there is no pain or shortening, a binder's board splint was directed to be carefully moulded so as to envelop the buttock and to extend a short distance above the crest of the ilium and downward upon the thigh. This splint was designed to keep the joint at perfect rest, and under this treatment recovery, with anchylosis, would be looked for. It was advised that all pressure upon the foot of the affected side be most carefully avoided.

HYDROCELE.

At the same clinic was also exhibited a case of hydrocele in a child of six years. Five months ago the patient received a fall, shortly after which swelling of the scrotum was observed. This had been tapped four weeks before his presentation at clinic, and once previously. Each time some fluid was drawn off, and hopes were entertained by the physician in charge of the case that permanent recovery would follow without further operation; and, indeed, this is usually all that is necessary for the treatment of hydrocele in one so young; but if failure results, other measures must be adopted.

In the *Medical Times* for October 2, 1871, in the report of Prof. Agnew's clinic, mention is made of a case of hydrocele occurring in a child fourteen months old, following an exhausting illness. In that case a lotion of solution of muriate of ammonia was directed to be applied to the affected part two or three times a day. Under this treatment it was believed that three or four weeks would suffice to produce recovery; but, if such were not the case, a thread would be introduced, and the fluid then drawn off. At the expiration of twenty-four hours the thread would have performed its office and would be removed. The child did not return, and we cannot, therefore, do more than conjecture that the treatment first advised has proved successful.

It is interesting, however, to observe the increasing obstinacy of this affection with advancing age. In early infancy it tends to recovery unaided by surgical means; in childhood, measures serving to produce a moderate degree of inflammation in the tunica vaginalis testis are sufficient; while in adult life the more severe inflammatory condition produced by the injection of pure tincture of iodine alone suffices in a great majority of cases to effect permanent benefit.

In the case before us, Prof. Agnew introduced a needle, threaded with a single thread, through the walls of the sac at the bottom of the scrotum, and brought it out at the upper portion of the tumor. The fluid was then drawn off and the ends of the thread loosely tied together. He said that under no circumstances should the thread be allowed to remain longer than twenty-four or thirty hours. At the expiration of that time sufficient inflammation would be produced in the tunica vaginalis to prevent any return of the hydrocele.

CYSTIC DISEASE OF TESTICLE.

The patient, aged 28 years, presented a swollen condition of the scrotum on the right side, with fluctuation, and an enlargement and induration of the right testicle, which was also elastic and sensitive to the touch.

Examination by the usual test for hydrocele failed to exhibit any translucency of the tumor. Prof. Agnew said that this was not, however, a conclusive evidence of the absence of hydrocele, for the walls are sometimes thickened to a degree which prevents the transmission of light, though the fluid contained may be perfectly transparent, or the fluid itself may be dark. The lecturer said that the duration of the affection and its slow progress contraindicated carcinoma, but he was inclined to believe this to be a case of cystic disease.

A trocar and canula were then introduced and the fluid drawn off. It consisted of serum and blood, quite opaque, and present in considerable quantity.

After the evacuation of the fluid the testicle was more distinctly felt. It was large, extremely painful, with softened portions here and there, and the enlargement was found to extend up the cord. The diagnosis of cystic disease was confirmed. The removal of the diseased gland offered the only hope of recovery.

CORRESPONDENCE.

DR. STEPHEN SMITH'S ARITHMETIC.

To the Editors of the Philadelphia Medical Times.

GENTLEMEN,—In the number of the *Philadelphia Medical Times* for December 1, 1871, I observe a communication from Dr. Stephen Smith, in which he quotes, from a review which lately appeared over my initials in the *American Journal of the Medical Sciences*, the following paragraph:

"Comparing the mortality of ankle-joint with that of leg amputations, Dr. Smith finds that in the United States army, during the War of the Rebellion, the death-rates of the operations in question were respectively 13.43 and 26.02 per cent., while in the Confederate service the death-rates were 20 and 27 per cent., and in the British army, during the Crimean war, 18 and 36 per cent. 'From these statistics,' Dr. Smith adds, 'it appears that amputation of [*at* in the original] the ankle-joint is 50 per cent. less fatal than the alternative amputation through the leg.' We cannot commend the accuracy of this calculation, which, indeed, we are a little surprised to find in the work of a writer who is so much accustomed to statistical investigations as is Dr. Smith. Eighteen per cent. is, indeed, half of, but by no means 50 per cent. less than, 36 per cent.; and the difference in death-rates is obviously *not* 50 per cent., but 12.6, 18, or 7 per cent., according to the figures derived from the different sources mentioned."

Upon which Dr. Smith remarks:

"The statement in the text was to the effect that the death-rate in ankle-joint and leg amputations in the United States and British armies was in the ratio of one of the former to two of the latter. The 'accuracy of this calculation,' based on these statistics, that ankle-joint amputations were 50 per cent. less fatal than leg amputations, and also the accuracy of the reviewer's calculation, that '18 per cent. is, indeed, half of, but by no means 50 per cent. less than, 36 per cent.,' I am quite willing to leave to the decision of the reader."

I have heard, Messrs. Editors, of an eminent professor who, having found, with the poetical schoolboy, that

> "Multiplication is vexation,
> Division is as bad,"

determined always to calculate averages by the aid of logarithms, so that he might substitute for long division the simpler process of subtraction; but Dr. Stephen Smith's mind is evidently differently constituted, for he insists upon subtracting by the "rule of three."

Before entering upon a consideration of the comparative accuracy of Dr. Smith's and of the reviewer's calculations, permit me, in the first place, to point out distinctly that the "statement in the text" to which exception was taken in the review was simply that "amputation at the ankle-joint is 50 per cent. less fatal than the alternative amputation through the leg" (Surgical Memoirs, U. S. Sanitary Commission, vol. ii. p. 103), repeated a few pages further on (*op. cit.*, p. 106) in the words "ankle-joint amputations are fifty per cent. less fatal than leg amputations," and that the "statement in the text" contained no reference whatever (in words) to the "ratio" borne by the death-rate of one operation to that of the other. Thus much by way of preface, to show that the question at issue is purely one of arithmetic, not one of surgical fact.

Let us see now how Dr. Smith's "new departure" in mathematics—his rule-of-three system of subtraction—applies to some of his other calculations.

Dropping decimals, 18 per cent. is to 36 per cent. in the ratio of one to two; therefore (according to Dr. Smith) it is one-half, or 50 per cent., less.

Similarly (taking the figures of the U. S. Army), 13 per cent. is to 26 per cent. in the ratio of one to two; therefore (still according to Dr. Smith) it is one-half, or 50 per cent., less.

Very good:—in the next section of Dr. Smith's essay (*op. cit.*, p. 103) we find discussed the comparative frequency with which ankle-joint and leg amputations require reamputation; and here the figures are, for the ankle, 12 per cent., and for the leg, 9 per cent. Now, 9 per cent. is to 12 per cent. in the ratio of three to four; therefore (if Dr. Smith's rule be a good one) it is one-fourth, or 25 per cent., less; and yet, on page 106 of his essay, Dr. Smith tells us that the difference is only 3 per cent., which is the result we should have obtained by the old-fashioned method of subtracting 9 from 12.

Does not this show that in his previous declaration, that 18 per cent. was 50 per cent. less than 36 per cent., and that 13 per cent. was 50 per cent. less than 26 per cent., Dr. Smith made a slip of the pen, or, in plainer words, a blunder—and that he has now made the much graver blunder of not acknowledging his mistake when it is pointed out to him?

Allow me to trespass a little further on your space, Messrs. Editors, in order to propound a few short questions in Mental Arithmetic, which (to borrow an expression from Father Tom, when he was about to "make a hare" of the Pope in "theology and the cube-root") let Dr. Stephen Smith "catapomphericate in two shakes" if he can:

1. Does Dr. Smith really believe that the difference between 18 per cent.—or $\frac{18}{100}$ (for it is the same thing)—of a dollar, for instance, and 36 per cent., or $\frac{36}{100}$ of a dollar, is 50 per cent., or $\frac{50}{100}$ of a dollar?

2. Does Dr. Smith really believe that the difference between 18 per cent., or $\frac{18}{100}$, and 36 per cent., or $\frac{36}{100}$, is the same as

the difference between 13 per cent., or $\frac{13}{100}$, and 26 per cent., or $\frac{26}{100}$?

3. If 18 per cent. is 50 per cent. less than 36 per cent., how much less is it than 68 per cent.?

4. If 9 per cent. is only 3 per cent. less than 12 per cent., as skilfully remarked by Dr. Smith (*op. cit.*, p. 106), by what wild flight of the imagination, not to say rule of arithmetic, can 18 per cent. be supposed to be 50 per cent. less than 36 per cent.?

"'Ha, ha, ha!—ho, ho, ho!'—says his Riv'rence. 'Who's the hare now, your Holiness? Oh, by this and by that, I've sacked you clane! Clane and clever I've done it, and no mistake!'"

And now, Messrs. Editors, I will be kinder to Dr. Stephen Smith than he seems disposed to be to me, for I will not merely point out the inaccuracy of his calculation and leave it "to the decision of the reader," but I will show him how he came to make his mistake, and how he may avoid it for the future.

Eighteen per cent. is unquestionably to 36 per cent. in the ratio of one to two, and it is less than 36 per cent. by half, or 50 per cent.—of what?—*not* of 100 per cent., but of 36 per cent.; that is, is less by $\frac{50}{100} \times \frac{36}{100} = \frac{1800}{10000} = \frac{18}{100}$, or 18 per cent., as was stated in the paragraph which has given Dr. Smith so much trouble. Similarly, the difference between 13 per cent. and 26 per cent. is $\frac{50}{100} \times \frac{26}{100} = \frac{1300}{10000} = \frac{13}{100}$, or 13 per cent.; and the difference between 9 per cent and 12 per cent. is $\frac{25}{100} \times \frac{12}{100} = \frac{300}{10000} = \frac{3}{100}$, or 3 per cent., as Dr. Smith has himself declared.

I am, etc.,

JOHN ASHHURST, JR.

PHILADELPHIA, December 5, 1871.

TO THE EDITORS OF THE PHILADELPHIA MEDICAL TIMES.

GENTLEMEN,—I find in the *Philadelphia Medical Times*, vol. ii. No. 27, p. 58, an article whose caption is "The Treatment of Smallpox," from which I quote as follows: "Dr. Alexander Collie, the resident medical officer at the Homerton Fever Hospital, says that treatment in the mild variety of variola is unnecessary, and in the black smallpox useless. In the confluent form, however, treatment is of the greatest importance, and the result of the case will sometimes be determined by it. . . . He should be allowed a highly nutritious diet, consisting of milk, beef-tea, eggs beaten up with whiskey, tapioca," etc.

As the notice given to Dr. Collie's treatment for confluent variola has the air of the writer's regarding the treatment as *something new* in the management of variola, especially in its confluent form, I desire to say, through the *Times*, that as far back as 1856, in the "Transactions of the Pennsylvania State Medical Society," and in 1857, in a paper which I read before the Philadelphia County Medical Society, and which was published in 1862 and liberally distributed among the profession and medical journals, and in a paper entitled "SMALLPOX, ITS PATHOLOGY AND TREATMENT," which was read before the American Medical Association, and which was ordered to be printed, and may be found in vol. xvi. p. 279 of the Transactions of the Association, I recommended a treatment identical with that proposed by Dr. Collie. The last paper was subsequently printed in pamphlet form, and I herewith have the honor to send you a copy of it.

Any of the papers to which I have referred will show you that I have presented, and endeavored by facts and argument to sustain, a pathology of smallpox,—may I be indulged in saying, the *true pathology* of that dreadful disease, which is the very opposite of the pathology usually regarded as correct; and that my treatment is in perfect harmony with my pathology, and that the results of the treatment, as indicated by the statistics, verify its correctness and high value.

So positive is the *nutritive character* of my treatment, which should commence in the confluent and semi-confluent forms, in which "quarts of pus are generated,"* at the vesicular stage of the disease, and continue through the miscalled secondary fever without any abatement, and be pursued until the patient is fully convalescent, that many quarts of milk, dozens of eggs, and pints of whiskey are taken by the unfortunate sufferer. So very useful a part does *high nutrition* play in the treatment of confluent and semi-confluent smallpox, combating the waste and drain upon the patient because of the large amount of pus developed and the vast sum of tissue to be reproduced, that I have called it "*the compensative nutritive treatment for smallpox.*"

May I ask a place in the *Times* for this communication?

Very respectfully,

A. NEBINGER, M.D.

PHILADELPHIA.

UNDULINA RANORUM.—Dr. E. Kay Lankester (*Quarterly Jour. Micr. Science*, October, 1871) thus names a new infusorial parasite which he has discovered in the blood of frogs. He at first took it for a very active white blood-corpuscle, but was enabled to kill the little creature by a small quantity of acetic acid vapor and then to make out its structure. "It was seen to be a minute pyriform sac, with the narrower end bent round on itself somewhat spirally, and the broader end spread out into a thin membrane, which exhibited four or five folds and was produced on one side into a very long flagellum. The wall of the sac was striated coarsely as in opalina; and the direction of the striæ on the two sides of the sac, as seen through the other, showed that the small end of the sac was twisted as well as bent over on itself. A pale, clear nucleus and a very few granules were also seen. In life the broad membrane undulates vigorously in a series of waves, the flagellum taking part, and presents then a deeply-toothed appearance. The movements produced by the activity of this membrane tend to urge the animal in a wide circle. The opposite extremity of the sac twists and untwists itself to a small extent also during life. The series of waves of the undulating membrane are not incessantly in one direction; after a certain time they change to the opposite direction, and then resume their original direction, an alternation of from right to left and from left to right being kept up." In the blood of one frog—where these parasites are not infrequent, as many as five or six being contained in a single drop—he noticed very numerous minute oblong bodies, which reminded him of pseudo-naviculæ which he has found in the cysts of the Gregarina parasitica or Tubifex rivulorum. These little oblong bodies were in many cases attached to the end of the red blood-corpuscles, just as he has seen the similarly sharply terminated pseudo-naviculæ of tubifex attached to pieces of tissue-fibre by the penetration of their points into such foreign substances. It seems not improbable from their association that these oblong bodies may be connected genetically with the little infusorial parasite.

GOITRE PRODUCED BY THE USE OF IRON.—Like M. Saint-Lager, Dr. Seitz (*L'Union Médicale*, Nov. 7; from *Med. Central Zeitung*, December, 1870) has become convinced that the use of iron will cause goitre in a certain number of individuals. In a case which he reports, a preparation of iron was administered for epistaxis, with the effect of producing enlargement of the thyroid gland, which disappeared when it was replaced by the iodide of potassium.

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* Watson's Practice, article "Smallpox."

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EDITORIAL.

THE MASSACHUSETTS MEDICAL SOCIETY.

OUR readers will remember that at the meeting of the American Medical Association held in Washington, May 3, 1870, objection was made to the reception of the delegates of the Massachusetts Medical Society on the ground that it "voluntarily and improperly furnishes shelter and gives countenance to irregular practitioners to such an extent as to render it unworthy of representation in the General Assembly of American Physicians." It appears from the answer to these charges, which the Society has prepared, that it does in fact contain among its members several practitioners of homœopathy who were elected before they had become converted—to use the current phrase—to the doctrines of Hahnemann, and who, although taking little or no part in the proceedings of the Society, have not chosen to resign. In consequence of the action of the American Medical Association, the Massachusetts Medical Society passed the following preamble and resolutions:

"Whereas the Massachusetts Medical Society has always endeavored to make, as its charter emphatically enjoins, 'a just discrimination between such as are duly educated and properly qualified for the duties of their profession, and those who may ignorantly and wickedly administer medicine,' while at the same time it has ever acted in accordance with the 'liberal principles' of its foundation, and shown itself ready to examine and to adopt every suggestion, from whatever source, promising improvement in the knowledge and treatment of disease;

"And whereas it is alleged that some of its fellows, in opposition to the spirit and intent of its organization, consort, in other societies and elsewhere, with those whose acts tend 'to disorganize or to destroy' the society;

"Therefore, Resolved, That if any fellow of the Massachusetts Medical Society shall be or shall become a member of any society which adopts as its principle in the treatment of disease any exclusive theory or dogma (as, for example, those specified in Art. 1 of the by-laws of this society), or himself shall practise or profess to practise, or shall aid or abet any person or persons practising or professing to practise, according to any such theory or dogma, he shall be deemed to have violated the by-laws of the Massachusetts Medical Society by 'conduct unbecoming and unworthy an honorable physician and member of this society.' By-laws, VII. sec. 5.

"Resolved, In case the society concur with the councillors in the foregoing resolution, that the president of the society shall appoint a committee of five fellows (to hold office one year and until others are appointed) to bring before a board for trial any fellow who, three months from this date or after, shall be found chargeable with the offence set forth in the foregoing resolution.

"Resolved, That, after concurrence by the society, the foregoing preamble and resolutions shall be printed, and a copy sent to every fellow of the Massachusetts Medical Society."

A committee, of which Dr. Luther Parks is chairman, having been appointed to prefer charges as provided for in the above resolutions, and the three-months limitation having expired, the charges of unbecoming conduct were duly made.

The questions naturally arise, why were not these or similar resolutions passed earlier, and why was action taken in the matter only when it was forced upon the Society by the Association? The officers of the former appear, however, to have had a forecast of what would result from such action. The Massachusetts Medical Society is an institution chartered by the State, and owning property in which every member has a vested interest, and can therefore exercise only such authority as is conferred upon it by the *laws of the State*, and is bound by all the obligations which the laws impose upon it, touching which powers and obligations the regular tribunals and not itself are the judges. The Society was founded at a time when homœopathy was not dreamt of as a possible delusion, and of course contains nothing in its charter which would enable it to expel homœopaths. It is therefore quite practicable for a person to attain the amount of knowledge required by law to pass the requisite examination, thus to establish his legal right to admission as a fellow of said Society, and afterwards to engage in the practice of medicine according to some exclusive dogma, such as homœopathy, without rendering himself liable to expulsion; and no by-law can be passed which will remedy this evil.

It was thought best, therefore, to take such precautions as would prevent the further admission of homœopaths, but to allow those already members to remain undisturbed, more especially as they were in such a minority as to be without influence on the legislation of the Society, rather than, by attempting to turn them out, to excite controversy and litigation. Exactly what was expected has taken place; for no sooner were the committee ready to proceed to trial than an injunction was served upon them restraining the Society from any decision which would expel from the organization any one of the members charged with improper conduct. Although it is thought that this injunction does not prevent the investigation from going forward and a decision of guilty or innocent being given, still it has virtually stopped the proceedings, and the homœopaths have gained for themselves that which they covet beyond all other things,—notoriety. Some of the secular journals, not only in Boston, but also here, have warmly espoused their cause, and have shown much ignorance

of the whole question and great unfairness towards the regular profession, which is held up to ridicule simply for maintaining, without fear and without prejudice, what it believes to be the right. It is difficult to understand how any one who has joined a medical organization can, if he retain a vestige of self-respect, remain a member of it after having become a homœopath; for he knows that in the eyes of his associates his *conversion* constitutes conduct unbecoming and unworthy an honorable physician; moreover, being excluded from the good fellowship which should prevail among the members of a society, and which, by the way, no process of law can ever compel them to share with him, he is cut off from many of its advantages, and must find his position, to say the least, an uncomfortable one. We can see nothing to admire in one who refuses to be judged by those with whom he has voluntarily associated himself, and to be governed by by-laws which he has promised to obey and to respect.

A newspaper, which a friend has sent us, contains an account of interviews between an irrepressible reporter and several of the homœopathic practitioners who are now upon trial. If one thing more than another has seemed uppermost in the minds of the latter, it is that pecuniarily speaking the agitation of the matter is likely to be of service to them, one going so far as to say, "It gives us gratuitous advertising." Another has hopelessly contradicted himself, for at one breath he says, "This whole agitation is really a battery of Quaker guns posted to prevent young graduates from going into the new practice," and in the next, that "The wiser and older members of the old society have little to say against our system, and advise letting us alone; it is the younger members who are instigators of this present movement, hoping to get notoriety and reputation by scandalizing us, as some older ones did in the past."

There is, in fact, no bigotry or intolerance in the recent action of the Massachusetts Society; and since the homœopathic members are, by their own showing, not likely to suffer by it, we fail to see how they have been harshly treated, and in what way they have merited the crown of martyrdom with which friendly editors are adorning them. Membership in the Society is not a prerequisite to entering upon a medical career in Boston, and expulsion from it is not of necessity followed by the loss of practice, and it certainly involves a stretch of the imagination to look upon the latter as an oppressive measure to prevent any one from practising medicine as his interests may dictate. It is, we think, not venturing too much to say that the homœopaths have been waiting patiently for this "gratuitous advertising." Hoping for and expecting this, they have, without deriving any benefit from the Society or taking part in its proceedings, paid their annual dues and meekly suffered slights and contumely through long years; and, apparently because they have disregarded obligations which every honorable man considers sacred, they are now approvingly patted on the back by a deluded public.

LEADING ARTICLES.

OLD-TIME EPIDEMICS.

THE most inveterate stickler for the superiority of the days of old over the degenerate times in which we live would have his faith materially shaken by a disinterested study of the history of the various epidemics which have from time to time afflicted mankind. In the earliest ages, and even up to this date, these have been supposed to be just visitations upon human depravity by the hand of the Almighty; but it would be illogical to reason that the moderately-destructive epidemics of recent days have been graduated to a more elevated tone of public morals. Certain it is that the terrible diseases with which the world was scourged in olden times have been handed down to us by tradition as models of vehemence and intensity in their symptoms, and of assured fatality in their results, which are not characteristic of a single epidemic, no matter how violent, in more modern times. Much of this successful mitigation of malignant diseases is probably due to improved methods of treatment and to a more general observance of hygienic laws; but, unlike other things, which seen at a distance seem diminished to the eye of the observer, the most ancient epidemics loom up in magnificent dimensions, and in virulence overshadow all the later pestilences that have disturbed the sanitary equilibrium of communities.

It was no uncommon circumstance in those days, if we can believe the records, for whole masses of the people—at least ten thousand "at one fell swoop"—to be stricken down by their devastations, and this, too, after a most extraordinary complication of symptoms. All kinds of putrid, malignant, and spotted fevers prevailed, and many of those attacked died almost instantaneously, or lingered for several days through watery, bilious, and strangurious fluxes, venomous apostemes, phrenzies, spurious parotids, imposthumes, pituitous tumors, defluxions, and a score of other symptoms which, though quaintly named, were overwhelming in their gravity. An epidemic of only moderate intensity is sufficient nowadays to affect the serenity of hundreds of thousands of people; but how great would be the sensation should the plagues which visited European cities and districts of country in previous centuries, and carried off thousands upon thousands of the population, find a counterpart of their virulence in this or any other portion of the globe!

The remedies gravely suggested to combat these epidemics seem to us, in these later days of intelligence, to be beneath the level of old women's recipes and charlatans' panaceas. It is no wonder that pestilences became unmanageable when, as in the plague of 1347, such vile and unmeaning compounds were administered as a decoction of rue, angelica, roots of reeds, roots of brambles, peaches, and roses, all combined together, with the addition of goat's horn and mule's hoof; or a powder composed of brans, beans, wheat, rye, millet, cockle-shells, and roasted brains of a goat,

in goat's milk. Even burnt bees, old shoes, powder of lizards, sparrows, and calcined powder of hens, crows, blackbirds, and dog-bones were employed during the progress of the epidemic. We are told, with all the positiveness of the utmost credulity, that the preventive, *par excellence*, which cured all that used it, was compounded of nitre, sulphur, borax, vitriol, alum, powdered gold, silver, brass, assafœtida, goat's excrement, crude mercury, vinegar, and rose-water, made into an infusion, boiled, dried, and powdered,—a drachm of this delectable mixture to be taken every morning. A century later, which an old writer describes as "a most tragical time of great destruction," the world had grown no wiser, for we find bezoardics, as they were called, prescribed, in which the most incongruous ingredients were administered to delicate stomachs. In epidemic smallpox, for instance, accompanied with peripneumony, hæmoptysis, and other alarming lung-symptoms, the virtues of a decoction were highly extolled, in which were massed together flowers of Turkey wheat, leaves of the cuckoo-plant, flowers of beans, honeysuckle, marigold, primrose, red poppies, chicory, prunes, lentils, Jerusalem oak, lungwort, nettles, cucumber-seed, and barley boiled in water or chicken-broth; while the diet consisted, among other things, of water distilled from a hen or capon, mashed—bones and all—with pearls, corals, precious stones, etc.

These are but trifling specimens of the hundred and one odd and fanciful articles that were for centuries both externally and internally prescribed as prophylactic and curative agents in the trying times of terrible epidemics. We of the present day, who have been educated to a higher standard of pharmaceutical refinement, would almost prefer to die from the disease under modern treatment than to recover under the disgusting load of mingled drugs and animal and vegetable refuse matter inflicted upon our unfortunate ancestors. The remedies suggested remind us forcibly of the contents of a sorcerer's caldron, whose qualities for good or evil were only to be developed by stirring and mingling, and mingling and stirring *ad nauseam;* and we can almost conjure up a picture of the apothecaries and practitioners of those days dancing around the seething caldron, like the weird sisters in Macbeth. The treatment of wide-spread malignant diseases noticeably improved, however, from this time forward, and the commencement of each new century witnessed the expunging from the armamentarium of the profession of many of the roots and herbs and animal products which had done little or no service in the cause of medical practice, though steadily resorted to in every emergency in which nothing better seemed to be indicated. As years roll by, and medical men become thoroughly convinced that a treatment founded on correct principles is of more vital importance than a mere routine adhesion to special drugs, we may hope for a further weeding out of the long list of agents, many of which occupy a corner of the apothecary's shelf, from which they are scarcely disturbed from the time of one revision of a Pharmacopœia to another. R. J. D.

TRANSLATIONS.

CONTRIBUTION TO THE PHYSIOLOGY OF CILIATED CELLS.

BY DR. LUDWIG LETZERICH,
of Braunfels.

Translated from the German by W. C. Kloman, M.D., of Baltimore, Maryland.

THE office of the cells which clothe the mucous membrane of the respiratory organs is not alone that of protecting the mucous membrane, but they especially preside over secretion. At present I will only treat of the anatomical structure and the physiology of the ciliated cells, but in a future work I intend to present the physiology of the cylindrical cells of the intestinal canal and that of the pavement epithelium.

If we allow small bits of the mucous membrane of the larynx or of the trachea to remain in Schultze's iodised serum for twenty-four hours, and after this place them for another twenty-four hours in very dilute (about $\frac{1}{2}\frac{1}{0}$ per cent.) chromic acid, after teasing out small fragments of the mucous membrane, under the microscope we see that the ciliated cells are provided at their bases with several processes. Furthermore, we very frequently see, and especially upon perfectly isolated specimens, that the processes of the ciliated cells stand in direct connection with connective-tissue cells. The length of these processes is very various, and the same obtains of their thickness. Towards the lumen of the larynx and the trachea, the ciliated cells, as is known, have a basal edge beset with cilia. Their nuclei are of a roundish, elliptical shape, and have tolerably large, dull-shining nucleoli. Their membrane is very delicate, the protoplasm slightly clouded, and it here and there contains small granules (rabbit, cat). On attentively observing isolated cells provided with processes, we see in them one or more dull-shining, round globules, which exist at one time at the base, then again in the centre, at other times at their upper end. They have the same form, the same physical constitution, as those which exist in the mucus upon the surface of the mucous membranes named. These globules, which I will name mucous or lymphoid cells, are not formed in the ciliated epithelium, but their places of formation are the connective-tissue cells, which stand in direct connection by means of processes with the epithelial cells. This is very distinctly seen in preparations well isolated. The lymphoid cells migrate from the places of their formation, the connective-tissue cells of the mucous membrane, and where they are still small, through the processes, ever becoming larger, towards the epithelial cells; in the latter they mount towards the ciliated basal edge and perforate it, in order to pass out with a portion of the cell-contents into the lumen of the larynx and trachea. The act of perforation may be best seen in its different stages in thin sections of mucous membrane which have been hardened for thirty-six hours in a dilute solution of chromic acid ($\frac{1}{2}\frac{1}{0}$ per cent.) or in dilute alcohol; and after carefully teasing out these sections, it is seen to be accomplished in the following manner. The lymphoid cells, having arrived at the basal edge, push firmly against it, and in consequence of the close pressure they cause a crescentic, slight indentation of the inner surface of the soft membrane. The lymphoid cells become somewhat pointed, at the same time bore an opening in the basal edge of the epithelial cells, and, at one time assuming an elongated, pointed form, at another an elongated form constricted in the middle (*bisquitförmige*), they force themselves through the soft, sarcode-like basal membrane. After their exit, the lymphoid cells again assume at once their round form.

From what has been stated, it follows that the ciliated cells present more complicated structures than has been hitherto supposed. The same is true also of the cylindrical cells of the intestinal canal. In both kinds of epithelium there are processes which are connected with connective-tissue cells. In the latter the lymphoid cells are developed, which migrate through the processes into the epithelium, mount up in these, and in consequence of their pressure against the soft basal membrane there produce openings and thus arrive at the free surface of the mucous membrane together with the greater part of the cell-contents. The question here may well be, What forces are in action which cause the migration of the lymphoid cells? Of course it is not possible for me to give a direct answer to this. However, we may with great probability assume that the connective-tissue cells, with which the epithelial cells are connected, communicate with a system of lymphatics, or, better, of nutrient canals, which passes over directly into blood-capillaries; in other words, that the connective-tissue cells communicate with the ends of the capillaries, only conveying the serum of the blood. We have therefore to adduce the blood-pressure as the motive power for the migration of the lymphoid cells. This assumption becomes a certainty by the observation of pathological phenomena, as we will see hereafter. The function of the epithelial cells of the larynx and trachea consists in an activity specially secretory. The lymphoid cells, which by their pressure against the soft basal membrane effect an opening of the epithelial cells, appear to be of great importance for the production of the secretion. The pressure exerted upon the fluid, that is, upon the protoplasm of the cells, probably does not suffice for the exit of the cell-contents upon the free surface of the mucous membrane, and certainly on that account the lymphoid cells are principally intended to open the epithelial cells in a mechanical way.

The openings which are produced in the basal membrane, as a rule, close again rapidly; yet it happens that here and there, especially in hardening bits of mucous membrane in chromic acid or alcohol, such newly-formed openings may be seen as gaps more or less round. The nuclei of the epithelial cells do not participate in the exit of the lymphoid cells and of the cell-fluid. They remain in the cells, and are held firm by means of a tough mass of protoplasm, which cements the nucleus to the cell-membrane, as I have very frequently seen in empty ciliated cells.

The function of the cilia upon the epithelium is known, and I have nothing new to add concerning it.

The physiological secretory process just described experiences considerable modification when circulatory disturbances arise in the mucous membrane. If we lay bare the upper part of the trachea of a young, half-grown rabbit, fix the same over a hollow sound, and for a half-hour repeatedly apply a dossil of cotton saturated with ether to the trachea, protected by tinfoil, —that is to say, produce cold by evaporation,—at the beginning we see the trachea assume a pale color, which soon disappears and gives way to a more or less considerable redness. If we examine, in albumen, recent microscopic sections of the mucous membrane, removed twenty-four hours later, we shall see, besides a decided capillary injection of the mucous membrane, large amounts of lymphoid cells, as well in the epithelial cells as also upon the free surface of the mucous membrane. We can also perceive the most various stages of the penetration of the lymphoid cells through the basal membrane. Besides the immense development of lymphoid cells in the connective tissue of the mucous membrane and their more rapid migration through the ciliated epithelium, there is a considerably increased pouring-out of fluid, which at this high degree of the exudation more or less injures the movement of the cilia.

In consequence of an increased supply of blood to a portion of the mucous membrane of the upper part of the trachea in this experiment, there was an increased development of lymphoid cells in the connective tissue and a more rapid migration of them through the ciliated epithelium. At the same time transudation of fluid, likewise increased, took place (fluid exudation).

UPON EXUDATION AND FORMATION OF PUS (CROUP AND DIPHTHERITIS).

I have for some years past occupied myself with the investigation of croupous exudations, and, where practicable, with the investigation of the mucous membrane covered with exudation after the fatal issue of croup.

In croup also we are dealing especially with an uncommonly increased activity of the connective-tissue cells standing in connection with the ciliated cells. If we make thin sections through fragments of the mucous membrane of the larynx or trachea (covered with the croupous exudation and hardened in chromic acid and bichromate of potassa),* we see an immense new formation of small cells in the connective tissue upon which the epithelium is placed, and with which it is connected by processes. At many places these cells lie together group-wise, but commonly their development takes place in more uniform distribution. We often see the ciliated epithelium actually stuffed full with the cells, so that in sections less thin and in superficial observation the appearance is as though the mucous membrane was deprived of its epithelium. The basal membranes of the cells are often immensely developed, and everywhere in this clear edge we see, penetrating cells and flowing out, coagulable, slightly granulated masses of exudation. The croupous exudation is stratified, because the cells contained in it are cast out with tolerable uniformity with the coagulable fluid and in rapid succession. The cilia of the epithelium disappear as soon as the formation of the exudation begins. The first coagulating layer of the exudation is felted with the cilia, which are torn off by the subsequent exudation. During the croupous process the epithelial cells themselves are often considerably enlarged; nay, it happens that individual processes of the cells dilate to almost the size of the cells. The empty, inactive cells existing in the epithelial stratum are narrow and clear.

The lymphoid cells, which are developed during the purely physiological process of secretion, and migrate through the epithelial cells, as also those which are found here only more abundantly after slight inflammatory irritations (for example, in false croup, catarrhal laryngitis), are essentially different from those cells which are developed in genuine croup and likewise migrate through the epithelium. For, while the lymphoid cells have a clear, dull-shining, rarely slightly granulated protoplasm, the cells in croup are pus-like. The protoplasm of the latter is clouded, and conceals more or less large granules in itself, looking like dark points. In croup, therefore, we are dealing with a new cell-formation (formation of pus), whose elements (pus-cells) pass through the epithelium to the free surface of the mucous membrane, with a considerable coagulable exudation derived from the serum of the blood. In many cases, with lesions having occurred in the tissue of the mucous membrane, I saw the cellular elements of the blood (red and white blood-cells) pass out in the same way to the surface of the epithelium. This is a proof that the connective-tissue cells, with which the ciliated epithelium is connected

* A mixture consisting of two drops of concentrated chromic acid with 45 grammes of distilled water, and the addition of 2.5 grammes of a ten-per-cent. solution of bichromate of potash.

by processes, communicate with a system of nutrient canals which is itself in connection with capillaries.

According to all my observations, croup is of an inflammatory origin.

If we compare the above-described mode of exudation in croup with that in diphtheritis, we are struck by the great difference, especially in the development of the pathologico-anatomical process. The croupous process of exudation is the result of certain inflammatory processes in the upper layers of the connective tissue of the mucous membrane of the larynx and trachea.

Since the cells of this connective tissue are, on the one hand, in direct anatomical connection with the epithelium, and, on the other, are in very probable—nay, certain—connection with a system of canals conveying serum of the blood, the products of inflammation can pass through the epithelium to the free surface of the mucous membranes in question.

In diphtheritis, the cause of the affection of the mucous membrane is a fungus penetrating from without inwards, which either destroys the epithelial cells or excavates in large sloughs, and now gives occasion to the diphtheritic exudation, in consequence of its penetration into the tissue of the mucous membrane. Hence it also comes that, according to the seat of the diphtheritic disease, the exudation varies microscopically and macroscopically. Upon those mucous membranes which are provided with a smooth, stratified epithelium (cavities of the mouth, nose, fauces, and the vagina) the exudation, as a rule, is firm, compact. Upon thin microscopic sections we see the exceedingly irregularly distributed mass of exudation permeated by corroded or also well-preserved epithelial cells, and by a greater or less quantity of pus-cells. Places occur in which conglomerations of pus-cells lie, and places where there is only an amorphous exudation. At those places where the diphtheritic exudation was intimately connected with the mucous membrane, and was felted with it, we find enormous masses of articulated thallus-fibrils, which are numerously ramified.

Upon mucous membranes which are covered with ciliated or cylindrical epithelium (larynx, upper part of trachea, intestinal canal) the diphtheritic exudation has a more cream-like, soft consistency, so that it can be easily scraped off by means of the back of a knife or the forceps. Herewith the epithelial cells are perfectly corroded, and portions of the exudation appear under the microscope like a mass of débris penetrated by a sod of fungi.

It occurs with uncommon frequency that diphtheritis and croup are developed side by side, and uniformly pass over into each other, moreover, without the two diseases being identical. It is very rarely that croup is developed in diphtheritis of the nasal, oral, or even faucial cavity. Frequently, however, nay, almost always, croup arises in the lower parts of the laryngeal mucous membrane and in the trachea, in diphtheritis of the under surface of the epiglottis and the upper part of the laryngeal mucous membrane, situated above the vocal cords. In most cases diphtheritis of the fauces already exists before the fungus penetrates into the mucous membrane of the upper part of the larynx. As a rule, the process passes over from the fauces or the tonsils into the larynx. I have seen the mucous membrane of the entrance of the larynx so much corroded and destroyed by the fungus, that upon scraping off the soft mass of exudation the deeper layers of the connective-tissue of the mucous membrane were laid bare and were in shreds. The parasite penetrated through the tissues between the different cartilages of the larynx, and were even visible in the external muscles of the larynx. That in consequence of so considerable a diffusion of the diphtheritic fungus, and with the irritation produced by it in the connective tissue of the mucous membrane, intense inflammations arise, which being communicated to the trachea there cause the development of croup, is one of the facts observed by me in many cases. Croup has consequently been produced by the communicated inflammatory irritation which the diphtheritic disease effected, but it constitutes an independent disease, proceeding *pari passu* with the diphtheritis. I strenuously maintain this fact, in opposition to the views of Hartmann.* In post-mortem examinations of children who have died of laryngeal diphtheritis, I have had the opportunity of seeing that both of these forms of disease existed side by side. The mucous membrane of the entrance of the larynx, in one case (examined ten hours after death), was completely destroyed by the fungus, while the mucous membrane of the portion situated below the vocal cords was scarcely deprived of its epithelium, and was covered by a thin, cream-like layer of diphtheritic exudation. The tracheal mucous membrane, on the other hand, from its commencement to its bifurcation, was coated by a uniform croupous exudation, which could be tolerably easily removed, like an inserted tube. Upon investigating the exudation, no kinds of fungus-formations could be recognized, but a more or less regular stratification of the exudation, with imbedded pus-cells, etc., could be observed. The mucous membrane of the trachea, from its upper to its lower end, retained its epithelium, it is true, filled with pus-like cells, and the basal edge deprived of cilia, as occurs in simple, genuine croup. In this child death ensued from collapse, which was brought about by the transfer of the fragments of fungi into the blood, and the accumulation and multiplication of the fungus in interior organs, especially in the kidneys and spleen.†

Besides the different clinical pictures, and the varying course of both diseases, the development of the pathologico-anatomical processes is far different in croup and diphtheritis.

* Dr. Franz Hartmann, On Croup and Diphtheritis of the Fauces. Formation of Exudation and Pus. *Virchow's Archives*, vol. lii. No. 2.

† Experiments upon this—Letzerich, Diphtheritis and Diphtheria, *Virchow's Archives*, vol. lii. No. 2.

PROCEEDINGS OF SOCIETIES.

PATHOLOGICAL SOCIETY OF PHILADELPHIA.

THURSDAY, NOVEMBER 9, 1871.

THE PRESIDENT, DR. J. H. HUTCHINSON, in the chair.

DR. WILLIAM PEPPER presented a specimen of *papillary growth of the bladder*, and gave the following account of the case:

The patient was a large and vigorous laboring-man, aged 38 years, of temperate habits, who for a number of months was subject to occasional severe attacks of hæmaturia. The attacks could not be traced to any exciting cause, though he himself attributed them to the heavy lifting he was compelled to do in pursuit of his occupation. There were never any symptoms of renal or vesical calculus. The attacks usually lasted for several days, and recurred every few months. The hemorrhage was free, the blood being dark and mixed with clots. During the intervals the urine was quite healthy. His general health did not suffer materially until towards the close of the case. Treatment by peracetate of iron internally, and suppositories of tannin and opium, seemed to check the bleeding. On October 29, after an interval of the ordinary length, hemorrhage recurred, and continued, despite all remedial efforts, until November 8, when death took place. The bleeding was very profuse, and soon induced extreme prostration, the pulse being feeble and small, respiration sus-

pirious, stomach non-retentive, and the surface pallid and sallow.

The autopsy revealed extraordinary anæmia of all the tissues, but no organic disease excepting in the urinary bladder. This viscus was large and distended with florid blood-clots. The walls were thin and everywhere healthy, save over a spot of about one and a half inches in diameter, near the fundus of the bladder, which presented a soft fungous growth about the size of half a walnut. The color of this tumor was pinkish, and it was evidently highly vascular. Its structure was very soft and readily broken down.

The specimen was referred to the Committee on Morbid Growths, who reported as follows:

"The bladder presented by Dr. Pepper exhibited at the base of the trigonum, near the orifice of one of the arches, a papillary growth, which, when floated out in water, had a fine dendritic appearance. The finer papillæ were formed by a crop of capillary vessels, covered by several layers of cylindroid epithelium. It appears, therefore, a benign papillary growth."

Dr. J. E. MEARS presented a specimen of *multilocular ovarian cyst*, removed from Mrs. S., æt. 27. Her menses appeared at fourteen years of age, since when she has always been regular. She was married at twenty-one years, and has had one child, now five years old. In January, 1868, she was seized with intense pain in the right side. In a few weeks she had another attack of pain, accompanied by fever, and after this attack she felt a lump in the right side as large as her fist. In January, 1869, she said that she "caught cold in the lump," and it began to grow. On October 4, 1871, Dr. W. L. Atlee performed ovariotomy, removing the cyst, which contained sixty-five pints of fluid. The measurement of the abdomen at the umbilicus was fifty-one inches. The patient recovered.

Dr. J. M. BARTON presented a specimen of *recurrent round-celled sarcoma of the lower jaw*, removed from Frank R., æt. 27.

The tumor began growing in May of this year, and when first removed, the last of June, was as large as a walnut, and was situated over the lower jaw, midway between the angle and symphysis. It returned immediately, and *two* months after the first operation was as large as at first, and occupied the same situation, the line of incision from the previous operation crossing the centre of the tumor. It was removed by Prof. Gross at that time, and found to be a round-celled sarcoma. The wound healed kindly, and the man returned home.

On November 8, 1871, he presented himself at the Clinic of the Jefferson Medical College (two and a half months after the last and but four and a half after the first operation) with a tumor occupying the parotid region, differing from the former growth in having the skin discolored over it. It had contracted strong adhesions to the skin and surrounding tissues, and was removed with difficulty, requiring close dissection.

In its general appearance it presents the same characters as the former growth, but has not as yet been submitted to microscopic examination.

The specimen was referred to the Committee on Morbid Growths, who reported it a rapidly-growing round-celled sarcoma.

Dr. GEORGE C. HARLAN presented the specimens from two cases of *malignant disease of the ear*, with the following history:

A little girl, three years of age, was brought to the Dispensary of the Children's Hospital by her mother, from whom the following very imperfect history of her case was obtained: One year ago she had scarlet fever, and had never been in perfect health since. Attention was not called to the ear in any way at the time, or until a few weeks since. Three months ago she became restless and seemed in pain, and two months ago a slight discharge of blood from the meatus was noticed for the first time. Two or three weeks ago there was some pain in swallowing; the parts about the ear were swollen, and her face was drawn to the right side when she cried.

When brought to the hospital, there was a fluctuating swelling beneath and behind the left auricle, and in the external meatus a thick purulent discharge and a large, quite firm, rounded polypus, the size of a pea, or larger.

Under ether, the polypus was removed by the snare and forceps, and an incision was made into the external swelling. From the latter there was a copious discharge of offensive pus. No dead bone could be detected by the probe. Considerable relief followed the operation. The incision had a strong tendency to close at first, and could be kept open only by a tent, the discharge still continuing. In about two weeks, however, the wound gaped, and a fungous growth appeared in it, which continued to increase until it reached its present size. The polypus rapidly re-formed, but seemed to become strangulated by pressure on the external meatus, and sloughed away. The removal of the polypus was not followed by free bleeding; there was several times a slight, but never a profuse, hemorrhage from the tumor. The child died of exhaustion about eight weeks after it was first brought to the hospital. No post-mortem examination was permitted beyond the mere removal of the tumor. Extensive erosion of the temporal bone could be felt by the finger introduced in the wound; but it is impossible to say exactly what parts of the bone are involved.

The specimen was referred to the Committee on Morbid Growths, who reported it a round-celled sarcoma, with a network of bundles of spindle-celled connective tissue pervading it at irregular intervals in various directions.

The interest of the second case is much diminished by the loss of the history and notes, and of the record of the post-mortem examination, Dr. Harlan being absent from the city when it was made. The specimen presented a very extensive destruction of the ear and a great part of the temporal bone by malignant disease.

The patient, a woman about fifty-five years of age, applied for relief from a swelling behind the right ear, nearly the size and much the shape of half a hen's-egg. It had so much the appearance of an abscess with very thick and tense walls that two free incisions had been made in it by a surgeon. These had gaped widely, and fungous granulations were springing from them. They soon assumed the character of foul-looking sloughing ulcers, with a sanious offensive discharge and rapidly increasing in depth. An opening, through which the discharge flowed profusely, was formed into the external meatus, and extended until the auricle was almost dissected off. As the disease progressed inwards, the portio dura was involved, and the right side of the face was completely paralyzed. After several months of intense suffering, death resulted from direct extension of the disease to the brain.

Nearly the whole of the mastoid portion and a part of the petrous and squamous portions of the temporal bone, the walls of the external meatus, and the angle of the parietal bone were destroyed. The tympanum was laid open by the destruction of its membrane and a part of its upper wall, and the malleus is seen in situ apparently uninjured. There was an opening in the mastoid region an inch in diameter entirely through the bone, over the lower half of it. The dura mater remained intact, and on this account the lateral sinus had escaped. When we consider the great extent and rapid progress of the disease, and the close proximity of the lateral sinus, internal jugular, and carotid, it seems singular that there was no considerable hemorrhage,—a termination of the case in this way having been daily expected. The carotid foramen is to a great extent, and the jugular foramen almost completely, obstructed by a deposit apparently of bone. There is a similar deposit in the Glaserian fissure and over a considerable extent of the inner surface of the bone.

Dr. J. EWING MEARS exhibited the *uterus, bladder, and ovaries* removed from a patient of Dr. W. J. Fleming, of this city. The following is a short history of the case:

Mrs. V., æt. 46, was married at the age of twenty-three years, and has borne three children. Menstruation was regular until August, 1870. The disease first manifested itself in April, 1870, by a general fulness of the abdomen without œdema.

On June 18, 1871, she was tapped, and sixteen pints of dark-colored fluid were removed.

July 10.—She was tapped by Dr. W. L. Atlee, and a large bucketful of yellowish-green fluid was removed. At this time there was œdema of the abdominal walls and lower extremities. The fluid was submitted to Dr. Mears for examination, who reported to Dr. Atlee that he did not regard it as ovarian

in origin. On making post-mortem examination it was found that the fluid in each instance of tapping had been taken from the abdominal cavity, which at the time of the examination also contained a large quantity. The right ovary was the size of a small lemon, and solid. The left ovary had undergone cystic degeneration, and was about the size of a child's head. It was found occupying the *right* iliac fossa, and its pedicle exhibited a twist, to the extent of *two full* turns. The cyst was multilocular in character, and contained a small quantity of dark, dirty-colored fluid. The surface of the tumor had a congested appearance. It had never been tapped, and its growth had evidently been interfered with by the twist in the pedicle. The parietal peritoneum was very much thickened and roughened. On this surface and on the small intestines at different points were found small masses of plastic matter.

Dr. JOHN S. PARRY said he thought this subject of "twist in the pedicle" one of considerable interest. His attention was first directed to it about two years ago, and recently he had looked up all the cases he could find recorded. He found only ten unequivocal cases reported by English and American authorities; and he has been able to find references to only two papers on the subject by Continental writers,—one by M. Texier, of France, in 1869, and the other by Rokitansky, in 1865. Of the ten English and American cases, six terminated fatally and four lived. All of the four were operated upon, and none were accompanied before the operation by any symptoms pointing to this complication. All of the six fatal cases were attended by serious symptoms. Of the fatal cases, two died from the effects of gangrene, two from shock, one from shock and cyst combined, and the sixth from constriction of the bowel.

The only remaining case has been reported by Bennett, of Edinburgh. On dissecting the patient, the ovarian fluid contained much cholesterin, had the color and the odor of bile, and gave the characteristic reaction of bile. The most careful examination revealed no communication whatever between the intestinal canal and biliary passages.

One of the most interesting questions, Dr. Parry thought, was that of diagnosis. In the case of supposed axial twisting which he reported, there was a sudden enlargement of the cyst, its dimensions increasing from all directions in twenty-four hours. In most of the cases there was a considerable amount of blood effused into the cavity of the cyst.

Dr. MEARS said he had been fortunate in having the opportunity of examining many specimens of ovarian fluid, and had in every instance noted the presence or absence of blood. In a large number of cases there was a small quantity of blood, and he had found uniformly that such blood was present in the cyst by reason of the rupture of the walls of secondary cysts. He had never met a very large quantity of blood in ovarian cysts, and that which he found was generally in multilocular cysts. He considered such blood evidence, though not infallible, of their multilocular nature.

Dr. M. said Dr. Atlee has met in his operations a number of instances in which the pedicle had been twisted. Blood was only occasionally present in the cyst, and in no instance did he find the symptoms laid down by Dr. Parry. It is important, of course, to determine whether the twist is sufficient to interfere with the circulation of blood through the walls of the tumor; for if this should be sufficient to produce sudden congestion, such hemorrhage might result. He was inclined to think that the slight growth of the tumor in this case was due to the twist in the pedicle.

In all examinations of the fluid from this case he had reported it as non-ovarian fluid. It was not very viscid or gelatinous, was of a light straw color, and contained but a small quantity of albumen,—about as much as is found in the serum of the blood. There were a few shrivelled epithelial cells and some granular débris, but no blood. There was in this fluid a formation of fibrinoid substance. On Sunday last he had tapped a patient, who was supposed to be the subject of cystic disease of the ovary, of twenty-three pints of fluid. This fluid was kept and exposed to the air, and in a few hours a fibrinoid mass formed in it. He was satisfied from this fact that the fluid had not come from an ovarian cyst. He thought this substance was not found within the walls of an ovarian cyst, and considered its presence or absence to be at least of some value in the diagnosis.

The fluid contents of ovarian cysts vary in their physical properties and microscopic appearances according to the character of the cyst from which they are removed. In simple unilocular cysts, in which usually but little fatty degeneration has taken place in the cells of the internal lining membrane, the fluid contains but a small quantity of solid contents; it is, therefore, not very viscid, contains usually somewhat more albumen than is found in the serum of the blood, is transparent, of a straw color, and presents under the microscope a few granule-cells and free granules. In multilocular cysts the fluid contains more solid matter, owing to the disintegration of the cells which have been thrown off by the process of fatty degeneration. It contains also more albumen, which is derived from the disintegrated cells, and which is added to that existing in the liquid portions of the fluid. It usually presents a characteristic chocolate color, owing to the presence of the fatty matter, and also of blood, derived from the division of the vessels in the walls of the secondary cysts which are ruptured. The large proportion of albumen renders it very viscid and gelatinous, and the microscope shows it to contain a large quantity of granule-cells of varying sizes, free granules, blood-corpuscles, sometimes altered in appearance, and frequently plates of cholesterin.

The compound granule-cell found in ovarian fluids does not belong exclusively to these fluids; it is found in many other fluids, and cannot with propriety be designated as the *ovarian cell*.

Dr. WILLIAM PEPPER said that he had had little experience with regard to the formation of fibrinoid masses in ovarian fluids, but so far as his experience went he agreed with Dr. M. He could not, however, agree with him as to these masses being found only in fluids of inflammatory origin. They very generally form in ascitic fluids, commonly the next day after tapping, and also in pleuritic fluid, whether or not of inflammatory origin. That there is in many such cases some degree of inflammatory action is unquestionable; but it very rarely happens that we have a large serous effusion without finding, on allowing it to stand, the formation of more or less of these fibrinous masses.

In answer to a question of Dr. Mears, Dr. Pepper said he did not think that the substance was necessarily or strictly fibrinous, though possibly the result of exposure on some of the fibrinoid matters of the fluid.

The specimen was referred to the Committee on Morbid Growths, who reported that "the tumor was almost entirely converted into a cyst, with brittle, granular, reddish-brown contents, which on microscopic examination proved to consist of partially-bleached shrunken blood-corpuscles and granular detritus."

REVIEWS AND BOOK NOTICES.

A NEW OVARIOTOMY CLAMP. By B. F. DAWSON.

In this little pamphlet Dr. D. prefaces the description of his new ovariotomy clamp by a few pertinent remarks on the difficulties encountered in ovariotomy. He alludes to the great improvements in this comparatively new operation, and then proceeds to the many ways of treating the pedicle,—viz., to ligate it and return it to the peritoneal cavity, to clamp it and keep it external to the abdominal wound, or, in lieu of these, to use the écraseur, actual cautery, or laceration. The most distinguished operators use the clamp, which is followed by much better results than the ligature. The object of all clamps is to so compress and retain the pedicle as to control all hemorrhage, either temporarily, until the ligature is passed, or permanently, without the ligature. All clamps compress the pedicle between two parallel arms of metal brought into coaptation by two screws, or a hinge and screw combined, except the new clamp of Dr. Atlee. They all have a tendency to cause a spreading of the pedicle while being compressed, which forces open the edges of the wound and prevents perfect ligation of the pedicle. It also causes the pedicle to expand transversely to the wound, and thus prevents a proper approximation of the edges. Dr. Atlee's new clamp prevents this spreading, by compressing in four directions; but, although a good one, it is complicated, and not so readily

adjusted as that invented by Dr. D., while the circular clamp of Mr. Spencer Wells does not nearly so thoroughly prevent the spreading. Dr. D. claims for his clamp a new mode of action and simplicity of mechanism. "Its principal features are—1. It compresses the pedicle in a uniform manner, and into as small a compass as may be needed. 2. The compressing force is exerted by a single screw. 3. Its application is quick and exceedingly simple. 4. With it a ligature can be passed directly around the compressed portion of the pedicle, and be made more secure than with other instruments. 5. Ecrasement can be performed."

The clamp consists of two elliptical arms of metal, fastened together by a hinge-joint at one end, and at the opposite end by a thumb-screw. Along these arms a slide (a semi-ellipse) is moved by a strong screw, passing out between the ends fastened by the thumb-screw. The arms are separated by the hinge and one is passed around the pedicle, when they are fastened together by the thumb-screw. The slide is now screwed down upon the pedicle, and certainly does compress it in a uniform manner and into a very small compass. If we wish to ligate the pedicle, we pass a ligature beforehand between the lower blades of the slide and the arms, and then apply the clamp. Thus the ligature can engage the pedicle as tightly as may be desired, and without any strain upon it until the clamp is removed.

This instrument can also be used to remove hemorrhoids, portions of the tongue, penis, scrotum, and extraneous growths. It is very light and compact; we think well of it, and feel assured that it will meet most of the objections to clamps in general.

THE PHYSICIAN'S DAILY POCKET RECORD: comprising a Visiting List, many Useful Memoranda, Tables, etc. By S. W. BUTLER, M.D. Philadelphia, Published at the Office of the *Medical and Surgical Reporter*, 1871.

The Pocket Record is evidently intended to meet the wants of the busy practitioner of medicine, for, besides containing a visiting list, which is so arranged that it may be used for a year from any date, it comprises, as its title-page indicates, many useful memoranda and tables. Among these are to be found "A List of New Remedies, their Application, Doses, and Market Value," which has been revised by Horatio C. Wood, M.D., Professor of Medical Botany in the University of Pennsylvania.

It contains also some directions for the treatment of persons asphyxiated, and for the examination of the urine, together with the doses of medicine for hypodermic injection and for inhalation. The spring by which the book is fastened will be found, we think, very convenient.

THE PREVENTION OF ABSCESSES IN HYPODERMIC MEDICATION, with a Description of an Instrument for the Injection of Strychnia. By REUBEN A. VANCE, M.D., Physician-in-Chief to the New York Institution for the Paralyzed and Epileptic, etc.

CLINICAL EXAMINATIONS OF URINE, with a Description of a Convenient Apparatus for its Speedy Analysis. By REUBEN A. VANCE, M.D., etc.

Both of these pamphlets are reprints from *The Medical World*. The former contains a description of a syringe by means of which so small a quantity as the eighth of a minim may be injected hypodermically. Believing that the abscesses which so frequently follow the use of hypodermic injections are caused either by the use of a too acid solution of the medicine employed, by a rusty condition of the needles, or by the injection of too large a quantity of fluid, Dr. Vance recommends that the solution shall be as concentrated and as slightly acid as possible, and that the syringe shall be provided with gold needles. He recommends the use of the following solution of strychnia:

℞ Strychniæ Sulph., gr. j;
Acid. Acet. dil., ℥j;
Aquæ, ad ʒj. M.

S.—Ft. sol.

He believes acetic acid, because it is an organic acid, to be less irritating than the mineral acids, while its solvent power is as great as that of nitric or sulphuric acid.

In the second paper, Dr. Vance describes an apparatus for the speedy analysis of the urine, and calls attention to the proper application of the tests for the detection of albumen.

BOOKS AND PAMPHLETS RECEIVED.

The Transactions of the American Medical Association. Vol. xxii. 8vo, pp. 383. Philadelphia, printed for the Association, Collins, Printer, 1871.

Modern Medical Therapeutics: A Compendium of Recent Formulæ and Specific Therapeutical Directions. By George H. Napheys, A.M., M.D., one of the Editors of the Half-Yearly Compendium of Medical Science, etc. Third Edition, Revised and Improved. 12mo, pp. 496. Philadelphia, S. W. Butler, M.D., 1871.

The Physician's Daily Pocket Record: comprising a Visiting List, many Useful Memoranda, Tables, etc. By S. W. Butler, M.D. Philadelphia, Published at the Office of the *Medical and Surgical Reporter*, 1871.

Stimulants and Narcotics, Medically, Philosophically, and Morally considered. By George M. Beard, M.D. 12mo, pp. 155. New York, G. P. Putnam & Sons, 1871.

Eating and Drinking: A Popular Manual of Food and Diet in Health and Disease. By George M. Beard, M.D. 12mo, pp. 180. New York, G. P. Putnam & Sons, 1871.

Transactions of the Medical Society of the State of Pennsylvania at its Twenty-Second Annual Session. 8vo, pp. 500. Philadelphia, Collins, Printer, 1871.

Three Cases of Imperforate Anus, with Remarks. By J. H. Pooley, M.D. Reprinted from the *American Journal of Obstetrics and Diseases of Women*.

Report of the Surgical Cases treated in the St. John's Riverside Hospital, Yonkers, during the Year 1870. By J. H. Pooley, M.D., Surgeon to the Hospital. Reprinted from the *New York Medical Journal*.

Transactions of the New Hampshire Medical Society. Eighty-first Anniversary. 8vo, pp. 110. Manchester, John B. Clarke, Printer, 1871.

Annual Announcement and Circular, Long Island College Hospital, Brooklyn, New York. Session of 1872.

Neuralgia, and the Diseases that resemble it. By Francis E. Anstie, M.D. (Lond.), F.R.C.P., Lecturer on Medicine in Westminster Hospital School. 8vo, pp. 296. London and New York, Macmillan & Co., 1871.

The Principles and Practice of Surgery. By John Ashhurst, Jr., M.D., Surgeon to the Episcopal Hospital, etc. Illustrated with Five Hundred and Thirty-three Engravings on Wood. 8vo, pp. 1011. Philadelphia, Henry C. Lea, 1871.

Boylston Prize Essay, 1871. Diseases of the Skin. The Recent Advances in the Pathology and Treatment. By J. Joy Jeffries, A.M., M.D. 12mo, pp. 79. Boston, Alexander Moore, 1871. For sale by Porter & Coates, Philadelphia.

Pulmonary Consumption: Its Nature, Varieties, and Treatment, with an Analysis of One Thousand Cases to Exemplify its Duration. By C. J. B. Williams, M.D., F.R.S., etc., and Charles Theodore Williams, M.A., M.D., Oxon. 8vo, pp. 315. Philadelphia, Henry C. Lea, 1872.

GLEANINGS FROM OUR EXCHANGES.

FATTY DEGENERATION.—The *Medical Times and Gazette* of November 4, 1871, contains an excellent editorial notice the result of some recent experiments by Voit (*New York Pharm.*, vol. xx. p. 340) on this subject. The fatty degeneration of organs, so frequent in disease, may be brought about in one of three ways: 1. The fat which takes the place of the tissues might be derived from the fat in the food. 2. It might be derived from other parts of the body which usually

contain fat, as the subcutaneous adipose tissue. 3. It might be generated in the cells of the affected organs by the splitting up of the albuminoids contained in these into nitrogenous and fatty substances. In the last case, the nitrogenous products of the metamorphosis of the albuminoids—as, for instance, urea—would not be altered in amount, but the consumption of oxygen in the body would be diminished. Further, it is possible that the cells of the structure may become atrophied, and disorganization of the tissue ensue, from more albumen than usual being decomposed,—more especially that which enters into the structure of the cells themselves. Obviously, in this case, the azotized constituents of the excretions would be increased, while the oxygen consumed would be either diminished or unaltered. The idea was conceived of giving phosphorus to dogs after depriving them of food for several days, it being well known that fatty degeneration of many, if not all, the organs is produced by the administration of phosphorus; and this was found to be the case when food was withheld. As the animal ingested no food, the fat here could not have come from that source, nor from the adipose tissue of the body, for it was found that that had disappeared, and, in consequence of abstinence from food, the animals were emaciated before the administration of the drugs. Hence the fat must have been the result of a metamorphosis of albumen in the organs themselves. A dog, placed in Voit's respiration apparatus, exhibited a diminution of forty-seven per cent. in the carbonic acid excreted, and of forty-five per cent. in the oxygen absorbed, when phosphorus was administered. The excretion of urea, previously constant, rose after the ingestion of the phosphorus, and increased after the symptoms of poisoning became more severe. The experiments of Voit, with whom Bauer was associated, show that in phosphorus-poisoning fatty degeneration is due to two causes,—the decreased oxidation of fat, and the increased production of fat by the metamorphosis of albumen. It is shown that this latter is independent of the supply of oxygen, and is dependent not so much on the oxidation of albumen as on the decomposition of the oxidized products of this substance. Voit and Bauer observed that no abnormal products are found in the urine except sarcolactic acid in fatal cases, thus confirming the results of Schultzer and Reiss. Leucin and tyrosin were looked for in vain in the urine of the poisoned dogs, although, as is known, these substances are abundant in cases of acute atrophy of the liver. They were found, however, in the liver, heart, and blood. It is thought very probable that leucin and tyrosin are among the first products of the decomposition of albumen, and that the nitrogenous bodies formed by the metamorphosis are changed into urea in the lighter cases of poisoning by phosphorus, while in the more severe cases the decomposition is imperfect and the less simple products of decomposition are excreted.

Voit considers that the main difference between acute atrophy and phosphorus-poisoning lies in the greater rapidity of degeneration in the former disease. Since the fat in fatty degeneration is solely that which has been formed in the organs, and either not oxidized or formed in too great quantity, it cannot be said when the diseased process begins and the healthy ends. At first the fat will be formed in its usual quantity from the circulating albumen, then from the stored-up albumen in the organs, and finally from the albumen forming an essential constituent of the cells; and thus the destruction and disorganization of the organs composed of these are brought about.

Tuberculosis of the Brain in Children.—In a paper on this subject, Dr. Fleischmann (*Journal für Kinderkrankheiten;* from *Jahrbuch für Kinderheilkunde*, iii. 1) reports twenty-one carefully observed cases of this affection. Of the twenty-one cases, six were under two years and fifteen over two years of age, the youngest eleven months and the oldest eleven years. As to sex, they were nearly equally divided, ten being boys and eleven girls. The largest number of deaths occurred in the spring and summer; in February, May, June, and September, each three, in March four, and in April two. The average duration of the disease was 2½ months, the shortest being eight days and the longest six months after the appearance of brain-symptoms. As to the seat, in eight cases it was the cerebellum, in eight the cerebrum, and in five both were involved. The common seat of the tubercles was the gray substance, more seldom the pons, the right optic thalamus, the peduncles of the brain, and the right corpus striatum.

A single tubercle seldom occurred, but usually two to three were present,—seldom more. In the twenty-one cases there was tubercle in other organs, with a single exception. As to symptoms, convulsions were present in thirteen instances, paralysis in twelve, four times involving the oculi motor, twice the facial and optic; insensibility of the skin was ten times observed, hyperæsthesia twice. When the cerebellum was involved, there was more frequent disturbance of special sense, involving more particularly the optic, facial, and auditory nerves. Basilar meningitis accompanied tubercles in the cerebellum eight times, and in the cerebrum four times, and there was chronic hydrocephalus without tubercular meningitis along with tubercles in the cerebellum in five instances, and once accompanying tubercles in the cerebrum, in each instance along with extensive tubercular deposit.

The experience of some observers that where there is paraplegia the tubercles involve the cerebellum, and that where one-sided symptoms present themselves the opposite side of the cerebrum is the first seat of the tubercles, Dr. Fleischmann's studies did not confirm.

Diabetes produced by Carbonic Oxide.—Senff has succeeded (*L'Union Médicale*, November 11) in producing a diabetic condition of the urine of dogs, by making them inhale carbonic oxide until the appearance of symptoms of poisoning, when the operation is suspended for a short time, to be afterwards resumed. The glycosuria which was thus produced lasted for three or four hours. The inhalation likewise gave rise to a free excretion of urine, which also contained a small amount of albumen. The introduction of a solution of sugar into the blood did not increase the amount of sugar contained in the urine. There was reason to believe that in these cases the diabetes depended upon an increased production of sugar by the liver.

MISCELLANY.

Singular Uniformity of the Mortality-Rate, illustrated by the Statistics of Cases of Smallpox in Philadelphia from 1860 to 1870 inclusively.

Years.	Deaths.	Cases.	Average.
1860	57	380	1 death in 6.6 cases.
1861	758	5,053	" 6.6 "
1862	264	1,760	" 6.6 "
1863	171	1,140	" 6.6 "
1864	260	1,733	" 6.6 "
1865	524	3,493	" 6.6 "
1866	144	960	" 6.6 "
1867	48	326	" 6.6 "
1868	1	7	" 7 "
1869	6	40	" 6.6 "
1870	9	60	" 6.6 "
Total	2,242	14,952	" 6.6 " or 15 p.c.

The above figures, which are taken from the records of the Board of Health, demonstrate in a remarkable manner the uniform operation of the law which has governed the rate of mortality from smallpox in this city during the last decade. It is very certain that all of the *deaths* from smallpox are duly reported, and quite probable that all *cases* of the disease are not so; and yet so uniform has been the ratio of this error that year after year the *proportion* of deaths to cases has been the same to a fraction. The average mortality of fifteen per cent. furnished by this table evidently refers to the unvac-

cinated as well as the vaccinated; for, apart from the fact that no such distinction is made in the reports, it is much less than the ordinary death-rate for the former, and much more than the average mortality among the latter. At the London Smallpox Hospital, during a period of fifteen years, the average mortality among unvaccinated persons of all ages was 37 per cent., while among the vaccinated the average mortality was 6.56 per cent. It is evident, therefore, that in our community, although a large measure of protection is derived from vaccination, a still larger one—one twice as great, indeed—would be secured by universal and thorough vaccination.

AN APPEAL TO THE ALUMNI AND FRIENDS OF THE RUSH MEDICAL COLLEGE, RECENTLY DESTROYED BY FIRE, FOR AID TO ASSIST IN ITS REBUILDING.—We cheerfully give place to the following appeal which has been sent to us from Chicago, and heartily commend it, not only to the notice of the Alumni of the Rush Medical College, but also to the friends of medical education generally in this country:

"This college is among the oldest institutions of learning in the Northwest, having been in operation since 1843, at which time the region now tributary to Chicago was but sparsely populated and had little wealth. During this time it has supplied a pressing need of this new country. It has educated a large number of young men, who are scattered through our whole country, worthily filling places of great usefulness and responsibility; and for this both themselves and the public are indebted, in a great measure, to the school in which they received their instruction. A large proportion of the students have been possessed of little save youth, hope, intelligence, and determination. Many of these, having been generously aided by the College, have taken rank among the most substantial members of the profession. The Faculty at all times since its organization has been moved by an earnest desire to promote the best interests of the profession and the College. For this its members have labored faithfully and earnestly; they have met the pecuniary burden of the school from its first foundation, and four years since they erected from their own resources, at an expense of seventy thousand dollars, the most ample and best-appointed college building on this continent, and filled it with every necessary appliance for successful teaching; and the influence and usefulness of the school have steadily increased from year to year. But in a day, the college building, with all its contents, was swept away, along with a large part of the city in which it stood a peer among many other noble institutions of learning. The pecuniary loss of the Faculty in the destruction of the college is light when weighed against others they have sustained. A number have lost nearly everything, and all have suffered much. The college must be rebuilt. Its past history, its future promise for good, demand no less. Under the circumstances, it is unreasonable to expect the Faculty to do this unaided. The College is now in a condition to justify an appeal to its Alumni and to society for some return for the favors it has conferred upon both. There is, perhaps, no field of benevolence that offers a richer return than to provide adequate and easy opportunities for instruction to those who desire to become learned in the best means for assuaging pain and healing the sick.

"All donations may be remitted to Chas. T. Parkes, M.D., 462 Elston Avenue, Chicago, who has been elected treasurer for the fund. They will be thankfully acknowledged, and faithfully devoted to the rebuilding of the college."

The following offer has been made by the trustees of the College:

"For every donation of five hundred dollars the trustees will establish a perpetual free scholarship, which shall bear the name of the donor, and which shall be conspicuously emblazoned on the wall of the lecture-room. A certificate of this scholarship, engrossed on parchment, will be issued to the donor, which certificate shall secure to the bearer free tuition and, when found qualified, free graduation. This certificate shall be perpetual in its operation, and thus the donor will have endowed for one student each year a Free Medical College.

"WILLIAM B. OGDEN, *Chairman.*
"GRANT GOODRICH, *Secretary.*"

METEOROLOGICAL.—The mean temperature of the month of November, 1871, was 41° Fahr. The highest temperature recorded during the month was 66°, on the 1st; the lowest was 22°, on the 29th and 30th. The highest mean temperature for November on record is 50°.5, in 1849; the lowest, 38°, in 1793, 1837, and 1842.

The total rain-fall for the month was 4.26 inches, the average rain-fall for the corresponding month during the past thirty-four years being 3.5 inches.

BARBARITY.—A number of medical students have been shot in Havana for desecrating the grave of Gonzalo Castañon. The punishment seems out of all proportion severe for the offence.

THE number of deaths from smallpox in Philadelphia during the weeks ending December 2 and 9 were 432, of which 239 were of minors.

MORTALITY OF PHILADELPHIA.—The following reports are condensed from the records at the Health Office:

	For the week ending		
	Nov. 25.	Dec. 2.	Dec. 9.
Consumption	35	5	33
Other Diseases of Respiratory Organs	34	19	34
Diseases of Organs of Circulation	19	31	15
Diseases of Brain and Nervous System	34	43	50
Diseases of the Digestive Organs	16	15	24
Diseases of the Genito-Urinary Organs	4	5	7
Zymotic Diseases	174	256	219
Cancer	6	6	7
Casualties	10	8	7
Debility	25	31	28
Intemperance	1	0	4
Old Age	9	17	12
Scrofula	1	0	4
Stillborn	15	18	20
Suicide	0	1	2
Tumors	1	2	3
Unclassifiable	9	10	11
Unknown	1	1	2
Totals	394	508	462
Adults	197	261	239
Minors	197	247	223

OFFICIAL LIST

OF CHANGES OF STATIONS AND DUTIES OF OFFICERS OF THE MEDICAL DEPARTMENT U.S. ARMY, FROM NOVEMBER 19, 1871, TO DECEMBER 4, 1871, INCLUSIVE.

GHISELIN, JAMES T., SURGEON.—By S. O. 453, War Department, A.G.O. November 23, 1871, to report to the Commanding General Department of the Columbia, for temporary duty at Portland, Oregon.

MCCLELLAN, ELY, ASSISTANT-SURGEON.—By S. O. 246, Department of the South, November 23, 1871, assigned to duty at Crab Orchard, Ky.

GIBSON, JOSEPH R., ASSISTANT-SURGEON.—By S. O. 452, c. s., War Department, A. G. O., to report to the Commanding General Department of the South for assignment to duty.

MACKIN, CHARLES, JR., ASSISTANT-SURGEON.—By S. O. 450, War Department, A. G. O., relieved from duty in Department of the Platte to proceed to Boston, Mass., and report thence to the Surgeon-General.

KOERPER, E. A., ASSISTANT-SURGEON.—By S. O. 220, Department of Texas, November 13, 1871, assigned to temporary duty at San Antonio, Texas.

DE WITT, C., ASSISTANT-SURGEON.—By S. O. 76, Department of Arizona, October 17, 1871, assigned to duty at Fort Yuma, California, relieving Assistant-Surgeon Lauderdale, under orders for New York City.